



INVESTIGATION OF THE EFFECTIVENESS OF DIFFERENT METHODS
TO INCREASE THE USE OF REUSABLE CUPS FOR
PURCHASED BEVERAGES AT A UNIVERSITY
CAMPUS IN THAILAND

BY

MISS SUPINTUDA SUKSANT

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE
DESIGN, BUSINESS AND TECHNOLOGY MANAGEMENT
FACULTY OF ARCHITECTURE AND PLANNING
THAMMASAT UNIVERSITY
ACADEMIC YEAR 2018
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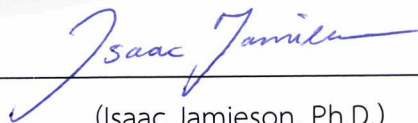
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ABSTRACT

Nowadays, plastic waste is a huge global issue. The widespread adoption of single-use and throw-away plastic products, and the mismanagement of plastic waste from urban areas, have severe long-term negative impacts on plants, animals, and humans. How we choose to manage and design our environments to better deal with and reduce plastic waste can have strong impacts on many important world sustainability issues that we face, such as climate change and ocean pollution. In particular, we as humans can create severe impacts to our world environment through poorly informed purchasing, usage, and disposal behaviours of plastic-based products. This is especially the case in Thailand, which is reported to be in the world's top ten countries for mismanaged plastic waste and land-based plastic-waste leakage into the ocean.

This present pilot study, undertaken in Thailand, investigates the effectiveness of different methods to decrease the use of single-use plastic cups and increase the use of reusable cups for purchased beverages at the Thammasat University Rangsit campus, where typically thousands of disposable plastic cups are

used and discarded every day. In particular, it looks into the current methods being undertaken at that campus to increase the use of reusable cups, and ways in which reduction of single-use drinks items may be increased still further.

The customer survey conducted as part of this present work was created in order to study consumer attitude and behaviour towards the use of reusable cups and environmental awareness at that location. The results from field study revealed that the use of an environmental message poster effectively increased the use of a reusable cups when combined with other measures, the provision of reusable cups in coffee shops and discounts for bringing personal cups, while the use of an environmental message alone did not demonstrate a significant effect. Regarding the customer survey, the results indicated that reducing their contributions to plastic waste is the main factor that influences customers to use reusable cups at the Thammasat, Rangsit campus. It was also observed that the financial incentive of providing a discount of more than 15 Baht for purchasing a beverage without requiring a single-use cup is the most preferred measure by customers to reduce this kind of waste plastic.

The long-term goal of this project is to encourage the use of reusable drinks items and pro-environmental behaviour by university staff and students in order to increase Thammasat University's sustainability, and to suggest the potential applicability and suitability of applying such measures elsewhere in the environment to reduce the creation of plastic waste.

Keywords: Reusable cups, Plastic waste, Sustainability, Purchasing behaviour

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CHAPTER 1

INTRODUCTION

1.1 Background

It is now widely accepted that the impact of plastic waste has become a serious issue. This is especially the case in Thailand which has been reported to be in the world's top ten countries for dumping plastic waste into the ocean. A report from Science magazine revealed that Thailand was actually the sixth worst plastics polluter in the world, as determined from the mass of mismanaged plastic waste entering to ocean from each country in 2010 (Jambeck et al., 2015). There is presently a continuous increase in plastic waste in Thailand, at a rate of 12% per year (equivalent to an annual increase of around 2 million tonnes) which is consequently affecting Thailand's economy, human health, and environment (Winn, 2016).

Plastic waste causes a great impact on the environment as related to land, sea and marine life. Up to 80% of all litter found in the oceans is plastic waste. It has been estimated that worldwide over a 1,000,000 sea birds, 100,000 sea mammals, turtles and numerous fishes die annually because of such pollution. Many more are harmed due to its presence (United Nations, 2017). Additionally, a new study reports that on average humans could each be ingesting around 5 grams of microplastics every week, with concerns being voiced by experts over the potential long-term effects on health of such a situation (Dalberg, 2019, Gerretsen, 2019).

Single-use plastics, including plastic bags, drink cups, straws and food containers account for around 80% of all plastic waste in Thailand. They are widely used and provided in the consumer marketplace including in shopping malls, supermarkets, fresh markets, convenience stores, restaurants and coffee shops (Mauricio, 2014).

The best practice to avoid the creation of plastic waste is to minimise the use of single-use plastic and not create such waste in the first place (US EPA, n.d.). Over the past decade, there has been the emergence of a strong environmental

movement worldwide focusing on addressing issues related to plastics. This is because of the significant environmental impacts caused by plastic waste itself.

Since the severe consequences of this waste stream have become more openly recognised, this increased awareness has triggered many sectors, including the public, educational, and commercial sectors, to launch environmental campaigns on this issue. They often incorporate campaigns to reduce plastic waste into their institute strategies to promote environmental responsibility to people and to encourage a reduction in single-use plastic consumption.

As an example of this, as a result of the Thai Government realising the seriousness of the issue, the Ministry of Natural Resources and Environment launched a scheme called 'Beat Plastic Pollution: If You Can't Reuse It, Refuse It' in order to reduce the use of plastic bags, foam cups and plastic cups in all government offices (Beat Plastic Pollution, 2018).

Moreover, many commercial businesses now show how they attempt to reduce plastic waste as a way to indicate that they are paying attention to, and are concerned about, the environment and not just concerned with making profits. This is often especially true with regard to their concerns on plastic cup usage, for which there are 9,758 million plastic cups used and discarded per year in Thailand alone (PCD, 2018). Such factors have driven many companies and educational institutes to launch their own campaigns to encourage customers to bring their and use their own personal cups instead of single-use cups.

Thammasat University (TU), as one of Thailand's top three leading universities in education and as part of the government education institute (Matichon, 2018), has been enthusiastically working on creating a green and sustainable university in order to reduce its environmental impact and to lead by example. Thammasat University has undertaken various of actions and initiatives with this in mind. With regard to waste management and waste awareness, TU launched its own waste recycle bank in 2006 to create waste awareness and encourage students and staff to actively recycle their waste (Phonprapai, 2016).

In addition, the Thammasat University's Rangsit campus launched a campaign called "No more single-use plastic" in 2018. Its aim is to raise awareness to

change and improve plastic consumption behaviour, to help address the severe plastic waste issues in Thailand, and address the plastic waste situation within its own campus which presently accounts for around 80% of its total waste.

With a staff and student population of approximately 40,000, the Thammasat University's Rangsit campus presently generates around 2,400 tons of garbage per year, only 30% of which is separated into recycling (GreenNews, 2018; Thai PBS, 2018).

That present campaign requested a measure on charging on the use of single-use plastic at convenience stores, requesting collaboration from the sellers in the campus to provide financial incentives for customers not to use single-use plastics. As an example, stores, shops and cafes are requested for cooperation to give discounts of not less than 2 Baht per cup to people who bring their own cups to buy drinks (GreenNews, 2018 ; Matichon, 2017). According to primary research by the researcher, even after this initiative to reduce waste was implemented on campus, most students are still not aware of that discount incentive on bringing their own reusable cups. The data gathered from interviewing 4 coffee shops owners on campus revealed that for all of them the rate of reusable cups used in their coffee shop is very low, and represents less than 5% of their total beverage sales. Interestingly, roughly similar figures were reported in the Mauricio (2014) study that stated that only 4% of customers in coffee shops at California State University took their own cups.

For Thailand, there is still little evidence on which kind of incentives could best increase the rate of reusable cup use in cafes and shops, and which factors affect customer use behaviour most related to reusable cups. Hence, there is a knowledge gap which presents an opportunity to examine which factors predominantly affect and can increase the usage of reusable cups by Thai consumers.

This study, which intends to address this knowledge gap, focuses particularly on coffee shops, as these are where the most plastic cup waste is generated. Plastic cups consumption exceeds 5 thousand tons per month in Thailand, with a low rate of recycling, with most used plastic cups likely to end up in landfill and the ocean (Nimkitikul, 2016). Because of the importance of the single-use plastic cup issue to the sustainability of the environment, the present researcher is

investigating customer behaviour and attitudes related to this product and the effectiveness of existing financial incentives and the implementing further environmental messages related to their use within the Thammasat University, Rangsit campus.

The research and its results are intended to help provide a better understanding of factors related to consumer behaviour with regards to the use of reusable cups and single-use plastic cups by students and staff at TU. Furthermore, the research results will potentially be useful for: other coffee shops in Thailand that wish to reduce their use of single-use cups; Thailand orientated marketeers; and companies interested in green marketing development. It is intended that the results will also be of relevance to sectors such as green product development, and can help act as guidance for creating effective guidelines to aid further product improvement and development.

1.2 Research Questions

- 1) What is the amount of plastic waste produced by the use of single-use plastic cups on campus ?
- 2) Which factors influence customers usage behaviour related to reusable cups?
- 3) Do financial incentives affect customers' usage behaviour of reusable cups or do they not influence them?
- 4) What will be effective motivations for promoting the use of reusable cups to the customer?

1.3 Research Objectives

- 1) To survey the plastic waste produced by disposable cups issued by coffee shops at the Thammasat University, Rangsit Campus.
- 2) To understand and study the relationship between attitudes toward environmental concern and behaviour related to reusable cups use.

3) To study incentives provided by coffee shops and examine the effectiveness of the financial incentives program that is being undertaken in TU, including identifying the most influential incentives that motivate customers to bring reusable cups.

4) To suggest guidelines for effectively promoting the use of reusable cups for coffee shops in Thammasat University.

1.4 Expected Benefits

1) The proposed guidelines created as a result of this work can be used by universities for developing more effective programs for implementing the existing financial incentive schemes for use in campus and/or for developing new campaigns for reducing the use of single-use plastic cups in a campus.

2) The report's recommendations will have the potential to be incorporated into guidelines, and best practices for relevant government departments, NGOs, and those in the private sector concerned with regard to environmental protection, to enable them to better communicate and promote green purchasing behaviours by people to enable them to be more likely to undertake more sustainable actions themselves. In particular, its recommendations will help increase people's awareness on environmental issues and how to undertake responsible consumption.

3) Commercial operators and entrepreneurs could use the recommendations made to help guide and finetune their production and marketing planning to enable them to gain opportunities to increase their business opportunities and market advantages as related to sustainability.

1.5 Scope of the Research

2.8 Contents

This research study measures and investigates incentives and factors influencing user behaviour related to the use of reusable cups in coffee shops. Among

the factors being considered with regards to users are: demographic factors, gender, age, educational level, occupation, and income. Financial incentives are also assessed, along with users' environmental awareness.

1.5.2 Population investigated in this research

The subset of the population investigated in this study are students and staff, faculty members, and administrators, at the Thammasat University, Rangsit campus, who buy drinks from coffee shops in the TU Rangsit campus area.

1.5.3 Sample set used in this research

The sample set of questionnaire in this study is comprised of students and staffs who buy drinks from coffee shops located in TU Rangsit campus that, as previously mentioned, provide financial incentives for individuals not to use single-use plastic cups. A target sample size of 110 individuals is used in this work.

1.5.4 Area and location

For the site experimental study, four coffee shops in Thammasat University, Rangsit campus, Pathum Thani that provide financial incentives for the use of reusable cups which are following: True coffee and Coffee corner, and coffee shops without financial incentive: Urbie and Fresh fusion, are being studied in this work.

For the questionnaire survey, those coffee shops in Thammasat University, Rangsit campus, Pathum Thani that provide financial incentives for the use of reusable cups, and those that provide no incentive for such cup use, were selected for distributing questionnaires.

CHAPTER 2

LITERATURE REVIEWS

2.1 Pro-environmental behaviours

Pro-environmental behaviours (PEBs), are described as behaviours that individuals intentionally seek to lessen a negative impact on the environment (Kollmuss and Agyeman, 2002). They are also defined as the actions that individuals commit to help address environmental issues behavior in nature and in the environments created by humans. For example, individual pro-environmental behaviour is directly affected by individuals' level of environmental awareness toward environmental issues (Jia, 2015). According to Stewart (2007) pro-environmental behaviours also arise when behaviours in the consciousness level occur related to the natural environment and man-made environment. Examples of this are the behaviours of reducing energy consumption and reducing waste generated from production (DEQP, 2015). Thus pro-environmental behaviour could be defined as the behaviour and expression of action with a consciousness that aims to improve the quality of the environment to be better. Whereas it is behaviour at consciousness level, it can be changed by external and internal stimuli and motivation of an individual's mind. The support studies also said that pro-environmental behaviour is complicated and cannot be described and illustrated solely through frameworks or diagrams. So it analyses the factors that are found to have an influence on pro-environmental behaviour which are: demographic factors; external factors; political and cultural economics; internal factors; motivation; environmental knowledge; environmental awareness; attitude; emotion; responsibility; and values (Kollmuss and Agyeman 2002).

de Groot and Stege (2009) have interestingly classified pro-environmental behaviour as a behaviour that is done for generating a benefit to others while the individual does not need to get any financial profit back from that action, which means that they have committed their actions to benefit someone or something else, for example, an individual's decision to use public transport. The journey may not be comfortable when compared to the use of a private car, but there are social and

environmental benefits because it reduces pollution and reduces traffic congestion. Also for waste separation cases, those who separate the waste must often be supplied with, or create, an extra area for the waste separation process, or need to find the data and obtain appropriate knowledge on waste management and sorting garbage. They devote their time and convenience to achieve this in order that society will benefit.

2.2 Barriers to Pro-environmental Behaviours

The internal and external restrictions to pro-environmental behaviours are both comprehensive and complicated. Thus, there is a need to determine both factors that are involved and those that influence people's attitudes and pro-environmental behaviours in order to overcome those barriers (Wylie, 2016).

Internal and external factors can be both influencers and barriers to pro-environmental behaviours. Restriction of external factors are out of the control of individuals and can include: politics; time; economic, social norms and cultural constraints; along with the level of complexity and difficulty to behave pro-environmentally; and accessibility to pro-environmental behaviour (Seguin et al., 1998; Kollmuss and Agyeman, 2002). In contrast, an internal restriction is within an individual's ability such as: a person's motivation; attitude; values; emotional drives; sense of responsibility; and education or knowledge (Seguin et al., 1998; Kollmuss and Agyeman, 2002).

2.3 Economic Behaviour

Economic Behaviour (EB) is described by Samson in *The Behavioral Economics Guide 2015*, as the study of cognitive, social, and emotional influences on people's economic behaviour which are easy to observe. EB is concerned with psychological experimentation to expand the theories about human decision making. Referring to EB theory; self-interest, cost and benefit computing, and one's preference are not always undertaken by people. Sometimes people make a choice without undertaking careful thinking. People's thoughts tend to be dominated by limited

information or knowledge, and feedback quality can be reduced by the capability of information processing by individuals. It usually is concerned with uncertainty and influenced by the contexts that effect the individual making a decision. According to Simon (1950s.), the term 'bounded rationality' reflects the importance of psychology on economics. This term was described from his view that people's minds must be understood relative to the environment in which they evolved.

Later on, in the work entitled 'Fast and frugal', Gigerenzer (Samson, 2016) expanded upon Simon's idea that the rationality of the decisions made depends on what people experience in the environment. From the book, 'Nudge', the principle of limited information or knowledge was discussed by its authors, Thaler and Sunstein (2008). They claimed that experience, good information and acute feedback are keys factors that can empower individuals to make good decisions. Climate change is a good example to illustrate this idea, as it has ever increasing its impact on our planet. Climate change is often at present unobservable to many and presents long-term, often gradual, changes to the environment so that individual actions towards pro-environmental behaviour, such as reducing in greenhouse gas emissions, is often unnoticeable in short-term change and also at local level. So there is unnotable feedback from undertaking such behaviours and people tend more to get some feedback from their previous choice before making a new decision or rejected it instead.

Other studies also mention that economics can highly influence people's decision-making and pro-environmental behaviour. For example, if there are two items, one is energy-saving and the other is not, many people will often choose the energy-saving items only when the payback period for energy saved is very short (Kollmuss and Agyeman, 2002). This is similar to limited information on feedback as previously described. Kollmuss and Agyeman (2002) also argue that the economist's assumption is not true that people usually make an economically rational decision, but that people can be influenced by monetary incentives to act pro-environmentally. For example, in the U.S., the impact of the Massachusetts Bottle Bill, a deposit legislation on beverages containers which provides a financial incentive for customers to return used bottles and encourage recycling and reuse behaviour is impressive. It has raised

the recycling rate by 80% compared to what was achieved before that deposit law was put in place (Sylver, 2018).

Economic factors are obviously significant for policymakers when designing new policies and strategies that aim to change people's behaviour as they are keys of influence that can affect their behaviour. However, in order to change people's behaviour, economic factors alone are not enough to create effective policies and strategies and to motivate people. As the economic factors are implicated with different factors; social and psychological aspects can be used to explain and understand the different contexts of each segment and area.

2.4 Social Norms

Social norms are one of the factors in the social dimension that influence an individual's decision, as there are social forces and social environment that shape people's decisions (Samson 2014). Social norms are society's expectations or rules on both the implicit and explicit behaviour of individuals (Dolan et al., 2010). They are crucial factors for economic actions that are a result of financial incentives and individual preferences (Akerlof and Kranton, 2010). Thus individual preferences are not only based on individuals' own tastes, but they are influenced by social norms and their role in society.

Social norms are considered as appropriate behaviours that are agreed, often by silent consent, by a majority of people. Informational feedback, such as the amount of money saved from not smoking, and descriptive feedback such as the comparison of one's smoking level and national statistical average, are often found in initiatives promoting change on health behavioural programs (Diclemente et al., 2001).

2.5 Demographic factors

Demographics, as defined in the Cambridge Dictionary (2018), is the study of populations, their characteristics and changes. Demographic factors include: age;

gender, education level; occupation; income; marital status; religion; members of a family. They are one of the personal factors that influence customer decisions and behaviours.

Several studies have found that demographics have an influence on pro-environmental behaviour. As a result, demographics are widely used as an independent variable in various studies to investigate their relationship with pro-environmental behaviour. As an example, Patel et al., (2017)'s studies, which investigated the emerging market and the role of demographic factors on consumers pro-environmental behaviour in India to guide the target market, found that there is a significant difference in each demographic segment. Kollmuss and Agyeman, (2002) additionally revealed that gender and years of education have been found to influence pro-environmental behaviour attitudes. An interesting result shows that females typically have less environmental knowledge than males, but have greater emotional concerns with regards to environmental issues. In addition, people with longer education generally have a more comprehensive knowledge about environmental problems. Hohmann et al., (2016) also mentioned in their studies that four demographic factors: Gender; Nationality; Age; and Occupation are all notably related to the intention to reduce the use of plastic bags in Bangkok.

2.6 Persuasive Environmental Messages

With the tangibly raising of awareness on environmental issues around the world, there are many environmental movements and campaigns to promote pro-environmental behaviour, which increase the challenges and needs for policymakers to change people's behaviour and lifestyles.

The most common strategy at the first stage is to prompt people's motivation to change their behaviour to pro-environmental behaviours (PEBs) is to use persuasive environmental messages. The environmental messages can often be crafted to be simple and influential with proper information to motivate people to have PEBs (Pelletier and Sharp, 2008).

To make them effective, they need to influence people's thoughts and empower their capability of information processing and not only make them exposed to the information that is presented (Petty and Wegener, 1998). Only being exposed to information, when it is not processed by people's thoughts does not lead to future action. However, information has to be presented in an appropriate way to catch people's attention and motivate them to change behaviour. Several studies about persuasive environmental messages mention that the environmental messages can be more successful when they integrate practicality, morality and social normative information towards the way they can change or undertake PEBs, instead of providing only the information as fact (Cialdini, 2003; Cialdini et al., 2006; Abrahamse et al., 2007; de Groot, Abrahamse and Jones, 2013). Pelletier and Sharp (2008) also discuss the influence of persuasive messages on particular behaviour changes toward PEBs. They revealed that the persuasive message may be more effective by appropriate tailoring of the information with proper behaviour phase change, along with the intrinsic and extrinsic goals, on message framing.

There is the example of persuasive environmental message that integrates social norms to promote PEBs. There are research studies investigating the relationship of social norms and pro-environmental behaviour which show that social norms importantly influence people's actions, increase their intent towards social norms, and improve the individual's behaviour with regards to those norms (de Groot, Abrahamse and Jones, 2013). Schultz et al., (2008) agree that using persuasive normative messages can enhance the predominant of norms.

A good example of this is provided in the experimental study by Goldstein et al., (2008) on the use of different messages to encourage hotel guests to reuse their towels in order to reduce water and energy consumption. The results of that work demonstrated that the message with a dominant social norm description (e.g., "Join your fellow citizens in helping to save the environment") is more effective to drive guests' motivation to reuse their towels than the traditional one that only focused on environmental protection and facts. The message that behavior a normative was found to increase the reuse of towels by 44% when compared to a 31% reuse rate using the traditional environmental protection message.

2.7 Message Framing

Message framing is the way often chosen to develop the successful and right message which refers to the technique of tackling and manifesting the people's perceptions of the consequent results of their behaviours in either of two different ways: benefits or gains, and costs or losses (Rothman and Salovey, 1997). Tversky and Kahneman (1981) describe how individuals make choices between alternatives that are concerned with risk. There are two ways to frame the decision of the outcome, either people perceive gains or perceive loss in an association with their specific reference.

Pelletier and Sharp (2008) propose that another key aspect of message framing is about intrinsic and extrinsic of gains or losses frame. Intrinsic is concerned with internal and personal factors such as health, well-being and personal growth. On the other hand, extrinsic is concerned with external factors like economic incentives: saving more money or earning more; comfort; social role; and reputation. So message framing can generate four different messages. Referring again to Pelletier and Sharp (2008), they provide an example of the message framing with regard to the use of private cars versus public transportation. They generated four messages on this which were as follows: a) intrinsic gains; using public transportation reduces global warming and improves your health; b) intrinsic losses; using private car raise global warming effects and make your health worse; c) extrinsic gains; using public transportation reduces global warming effects and saves money; d) extrinsic losses; using private cars raise global warming effects and cost you money.

The use and the effective level of the message on gains and loss frame is dependent on individual associated factors and behaviour. Rothman and Salovey (1997) propose that loss-framed messages are more preferable, being persuasive on examination actions like taking annual health check, which people perceive more risk, and that the gain frame will suitable for avoidance behaviour like using the sunscreen which people may perceive as being more careful.

2.9 The reusable cups issue

Reusable cups are considered as an alternative way to reduce the use of disposable cups. Disposable cups, are also referred to as single-use plastic cups, and are widely provided by coffee shops as drinks containers. Coffee shops use them specifically because it is convenient for them to do so and because they can be immediately and easily disposed of after use. After consumers have finished with their drinks they can be easily put in the garbage and the coffee shop does not need to take care of the cup after the drink was sold. Disposable cups are normally made out of polypropylene and polyethylene terephthalate plastic which are non-degradable in nature. Therefore, reusable cups are often praised for their environmental and sustainability advantages when compared with disposable cups that have a very short user-lifetime and are placed into landfill or find their way into the ocean after use, which cause severe environmental issues as a consequence.

There are many obvious benefits from using reusable cups. The first of these is the potential environmental benefit. According to the International Reference Centre for the Life Cycle of Products, Processes, and Services (CIRAIG) study, which compared the potential of environmental impacts of reusable and disposable cups, reusable cups have a higher positive score than disposable cups in: climate change issues; concerns over reducing greenhouse gas emissions; and also in the human-health section, a section that includes toxic exposure, smog and ozone issues (Roy, 2017). Moreover, over their lifetimes, reusable cups use less natural resources, such as fossil fuels. Disposable cups, however, use less water and energy in their production process. In fact, reusable cups consume more energy and materials than disposable plastic cups during their manufacture, but as a result of their long use life can create far less environmental issues (Cann and Unger, n.d.). So reusable cups are of most benefit to the environment after the number of times they are used exceeds break even point with disposable cups in terms of their environmental footprint. Each type of reusable cup also has a different break even point depending on the materials and processes used in its manufacture. For example, KeepCups have break even point after 30 times of use (Great Forest Australia, 2014). Depending on the materials and production

processes used for making a reusable cup, it can take between 20 to over 1,000 uses to reach its break even point compared to a single-use cup. The number of times that a reusable cup is used during its lifetime and the frequency of its use is very crucial to reducing potential impacts on the environment.

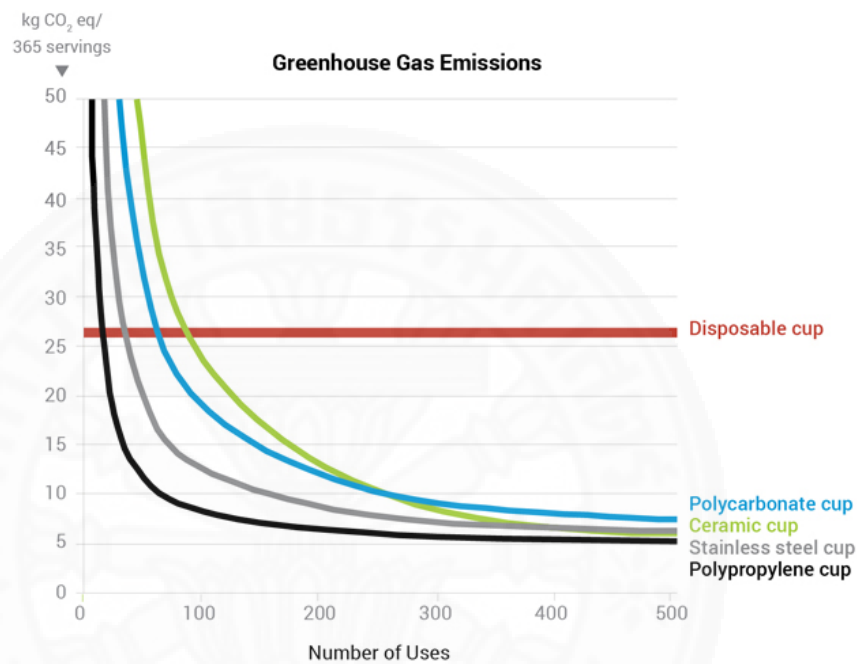


Figure 2.1 The greenhouse gas emission indicators comparison for different types of cups made out of different kinds of materials

Source: Roy, (2017).

The number of times a cup is used is paramount with regards to its actual level of sustainability impact. Indeed, only with frequent use can one decrease the potential impacts of the reusable cup. Counterintuitively, if a reusable cup is used fewer times than its breakeven point, then the single-use cup is actually better for the environment.

In addition to reusable cups being better for the environment if they are often used, they can also provide health benefits to their users as they can reduce exposures to toxins and contaminants that are often released by disposable cups during use. Disposable cups are mostly made of polypropylene plastic, even it is a

food grade plastic and Bisphenol A (BPA) free. BPA is a chemical compound that is found in many plastics which has negative impacts on human health. These include increasing the potential of heart disease in individuals and causing malfunctions of body hormones (Falck, 2017). It can also create contamination with other substances and chemicals that can leak into your drink and imitate estrogen, a human hormone.

In addition, the use of reusable cups can save users money when used in coffee shops. Nowadays many coffee shops offer economic benefits to customers who bring their own cups both in terms of price reduction and cup levy. These financial incentives encourage customers to reduce their use of disposable cups (Cann and Unger, n.d.). In Thailand, in general, coffee shops offer price reductions from 5 Baht to 10 Baht for the use of reusable cups, taking that minimum figure into account, if a single customer just purchased one drink per day over the whole year, the amount of potential economic benefit that customer would save from using reusable cup per year is around 1,825 Baht. In many cases the figure would be substantially higher. This amount of money is much more than the initial price of buying a reusable cup and makes it reasonable in financial terms, and a good financial investment, to have a personal cup as it can be of benefit to users over its extended lifecycle and help save the environment.

2.10 Previous Studies

Several studies have indicated that the financial incentives of discount being provided on drinks as a result of customers bringing their own cups have often not significantly impacted the use of reusable cups in coffee shops.

UK coffee chains have offered financial incentives to encourage consumers to use reusable cups since 1998. Starbucks was the first coffee chain over there to offer a 10p/cup discount for reusable cup users and increased the level of discount offered to 50p in 2016, but user take-up rates were still found to be low (Smithers, 2018). When adopting a different approach to this challenge in 2018, Starbucks found out that by rolling out a 5p charge on the normal cost of any drink purchase in situations where single-use plastic cups were used altered user-behaviour more

beneficially, with the number of customers bringing their own reusable cup or tumbler increasing from 2.2% to 5.8% (Starbucks, 2018). Thus, the result of financial incentives on both discount and levy have different impacts on customers choosing to use reusable cups.

Of particular relevance to this present research is a field study conducted in the UK at four business sites and eight university sites to investigate the extent to which the use of reusable cups may be increased through the use of easily undertaken actions (Poortinga & Whitaker 2018). The results of that work are shown in Figure 2.2

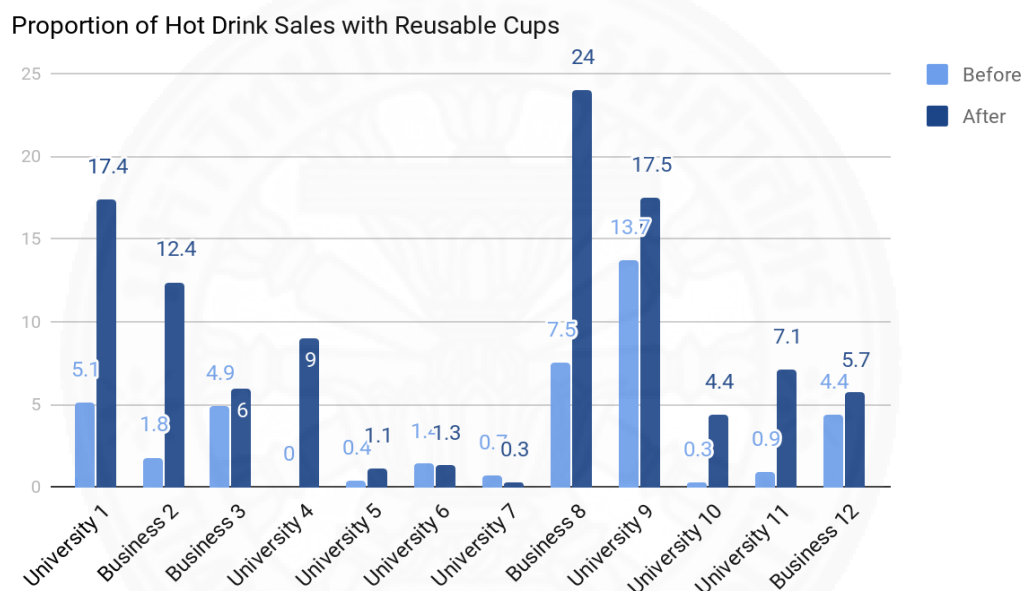


Figure 2.2 The proportion of hot drink sales with reusable cups at the twelve sites before and after intervention

Source: Poortinga & Whitaker, (2018).

From Figure 2.2, the results represent the percentage of beverages sale with reusable cups at 12 samples sites both before and after intervention periods of ten consecutive weeks (five weeks per phase). The average number of hot beverage sales made to individuals with their own reusable cups increased from 3.3% to 7.6%, with significant increases in uptake at site 1, site 2 and site 8. Site 1, a university which provided an environmental message, a charge on disposable cups, made reusable cups available for purchase in shop, and contributed free reusable cups for some customers,

reported an increase in reusable cup usage from 5.1% to 17.4%. Site 2, a business site, reported an increase from 1.8% to 12.4% with the combination of an environmental message, financial discount, availability of reusable cups for purchase in shop and the contribution of free reusable cups. The last of these three sites is site 8, a business site, that reported an increase from 7.5% to 24% in use of reusable cups, with reusable cups available for sale in shop and the provision of environmental messages. Other sites also increased their sales of hot beverages to customers with reusable cups.

The most impressive results in that research were obtained at the University of Winchester, which had previously reported in 2017 that around 30% of its hot drinks were now served in reusable cups compared to just 2% the previous year.

Prior to the successful conversion rate it received, it had previously got through 191,000 disposable cups annually, even though it had offered a 25p discount to those who took their own cups. Its impressive results were obtained by altering its pricing structure to have the drinks sold 25p cheaper as standard but with a penalty of 25p being charged if customers did not bring their own reusable cups. It also aided this initiative by giving away free reusable cups made of recycled materials that bear a sustainability message to its first-year students (University of Winchester 2017). *“The prices hadn’t really changed but the new expectation was that you would bring a reusable cup”* (Shaw 2018).

By 2018, the number using reusable cups in the University of Winchester’s cafes had risen to 33.7%, with it being indicated that giving students free reusable cups greatly contributed to their increased use. In one of cafes at that university, the use of reusable cups actually increased to 43.0% (Poortinga and Whitaker 2018), a figure significantly higher than that obtained by major UK coffee chains.

However, it is recognized that such results may only be representative for customers in that specific situation and different results could arise in Thai contexts.

In addition, with regards to waste plastic, there is a relevant study on consumer attitudes towards the ‘no plastic bags shopping day’ at supermarket stores in Bangkok (Jirawanchaikul, 2015). That study explored the relationship between consumer attitudes towards environmental concerns and behaviours towards rejecting plastic bags use, and also their attitudes towards incentives provided by supermarket

stores. The results of that work showed that females tended to reject plastic bags more than males and most of respondents knew about the environmental issues, but they considered that the effects did not impact their daily life and therefore they still use plastic bags. The most important reason that consumers gave for still using plastic bags in the supermarket is convenience, and the most important reason that consumers gave for rejecting the use of single-use plastic bags is because they would like to reduce plastic waste. That study found out that the charge per single-use plastic bag fee is the most influential measure to encourage customer to reject the use of single-use plastic bags in supermarkets.

2.11 Incentives measure to reduce plastic waste

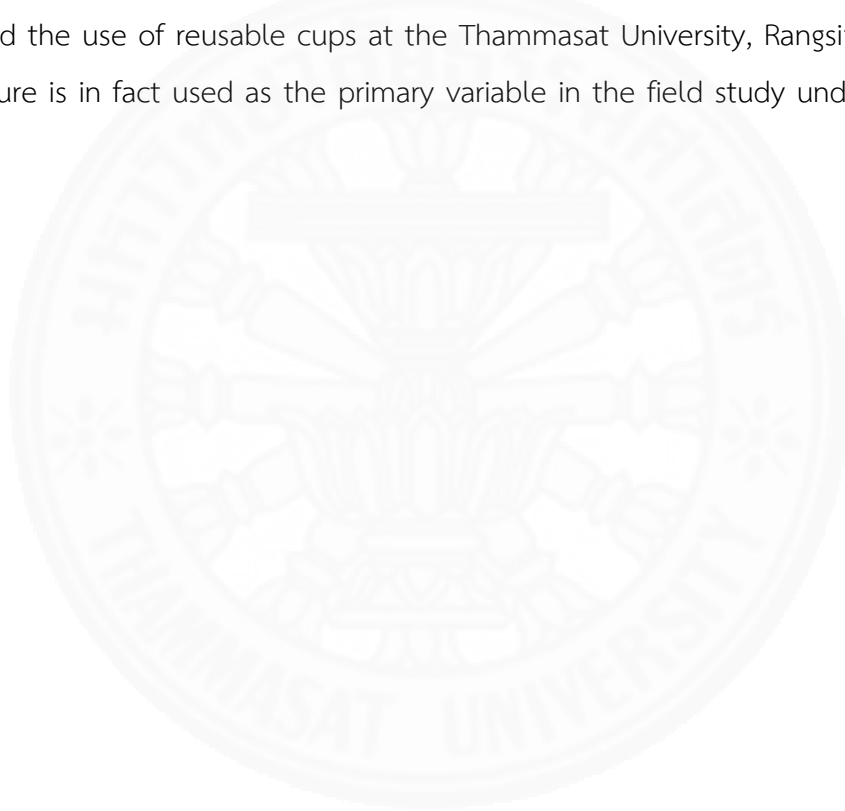
Reusable cups present a viable and highly attractive alternative container for drinks instead of the single-use plastic cups or disposable cups often used at present in coffee shops. The reusable cup can potentially significantly reduce plastic consumption by consumers in their daily routines and decrease the rate of plastic waste generation. Coffee shops at Thammasat University have used various incentive measures to increase reusable cup use.

Both the government sector and Thammasat University itself try to encourage coffee shops in Thammasat to create an environmental campaign to increase consumer awareness of environmental issues related to plastic waste. The measure that is widely undertaken on campus is providing a financial incentive for discounts to promote the use of reusable cups.

2.12 Conclusion from literature review

According to the literature review, pro-environmental behavior can be influenced and encouraged by various factors. Economic gain and loss are one of the sets of factors that can significantly affect one's behavior. It is therefore one of the factors that is being investigated as a variable in this research. Knowledge and education can also promote pro-environmental behavior as they can accelerate

people's sense of responsibility and attitude towards the environment. However, this depends on other external factors that people have previously experienced about the environmental issues. The environmental message is a tool that helps to deliver environmental knowledge to people in the general public with the aim to educate them on the impact of their behavior on the environment. The environmental message is considered as an easy implement measure to promote pro-environmental behavior in various industries. So this study specifically investigates the effectiveness of environmental message implementation to encourage pro-environmental behavior toward the use of reusable cups at the Thammasat University, Rangsit campus. This measure is in fact used as the primary variable in the field study undertaken in this work



CHAPTER 3

RESEARCH METHODOLOGY

This research covers field experimental work and survey research which was undertaken to investigate the efficiency of the existing financial incentives program and motivational factors that would influence customers' behaviour with regard to reusable cup use in a coffee shop. The research methods selected for this study are both the qualitative method for the short interviews, and the quantitative method which was undertaken by using a field experimental observation and a customer survey, with questionnaires being used as research tools. This chapter is comprised of the following contents:

- 1) Study design and procedure.
- 2) Secondary research.
- 3) Short interview.
- 4) Experimental study.
- 5) Customer survey study.

3.1 Study design and procedure

The field study covered the second semester of the academic year between February 2019 to March 2019 and was undertaken with the cooperation of four coffee shop sites in the university campus. The field study investigated the potential influences of situations with and without financial incentives, to compare the results on the relationship between financial incentives and reusable cups use in those coffee shops.

The sites chosen are all standard coffee shops that provide sitting areas which are predominantly visited by students and staff. The four coffee sites are also all located close to the university learning centre and the main library. Data on the number of reusable cups used in these coffee shops was collected through

observation to measure the effectiveness of financial incentives for 20 consecutive days. After that, each site displayed an environmental message poster for 20 consecutive days to determine whether or not implementing this measure can promote the use of reusable cups by coffee shop clientele. The number of reusable cups used was again noted, in order to enable the effectiveness of this motivational campaign on reusable cups behaviours to be assessed. The comparison (between the data collected before and after the intervention of the environmental message poster at each site) was also analysed to explore the most effective combination of strategies to encourage increased use of reusable cups. After the intervention, a questionnaire was used to assess the effectiveness of the incentive measures provided by those coffee shops toward customer's behaviour in order to better understand their barriers and their motivations.

3.2 Secondary Research

Secondary data were used to study and explore information and topic areas in greater depth, such as the present world situation related to the plastic waste issue and international and domestic movements on addressing plastic waste, and also the marketing measures that have been done elsewhere and their levels of effectiveness. Among the areas covered were previous relevant studies on this and related issues, environmental issues, and marketing and design initiatives to reduce plastic waste. The information was retrieved from reliable sources, including research journals, official business websites, trade associations, newspapers, books, and interviews.

3.3 Short interview

Short interviews were undertaken with coffee shop managers to collect data and information on the plastic waste produced as a result of the provision of single-use plastic cups by their shops and to study the measures that have been undertaken by coffee shops in Thammasat University Rangsit campus to encourage

customers to bring their own reusable cups in order to reduce the use of single-use plastic cups and the creation of waste plastic. The short interviews were used to help design and develop the questionnaire created for the customer survey.

Interview guide: Opened-ended questions

Part 1: General information on the coffee shops

- 1) Are you the owner of the coffee shop?
- 2) How much are your drinks on average?
- 3) How many single-use and reusable cups are used on an average per day?

Part 2 : Measures to reduce single-use plastic cup usage

- 4) What kind of measures do you have to reduce the use of single-use plastic cups?
- 5) Is there any measures you are thinking of implementing in the future to reduce the use of single-use plastic cups?

Part 3: Suggestions for reducing the use of single-use plastic cups

- 6) Are there any suggestions, ideas, or measures that you have to reduce your use of single-use plastic cups, or encourage customer to bring their own cups?

3.4 Experimental study

3.4.1 Research material

Environmental messages encouraging customer participation in the reusable cups initiative to reduce waste were positioned on the order counter bars at the coffee shops. The designs were similar to those used in the Poortinga & Whitaker (2018) experimental field study in Figure 3.1 and those used in the Chula Zero waste campaign (Chula Zero Waste, 2019) in Figure 3.2.



Figure 3.1 Examples of posters used in the previous UK study

Source: Poortinga & Whitaker, (2018).

In this present study, the graphics have been designed to specifically reflect the Thai context and also the situation of plastic waste in Thailand. The design was inspired in particular by the successful environmental campaign, Chula Zero Waste.



Figure 3.2 Examples of posters used in the Chula Zero Waste campaign

Source: Chula Zero waste, (2019).

The contents of the poster used easy to understand wording to make it more understandable and better related to daily customer lifestyle to link their

behaviour to the contents in order to visualise and simplify this knowledge to the receiver.

The design in Figure 3.3 consists of an environmental message on the negative impacts of single-use plastic cups to nature. For example, the effect of plastic waste accumulating in landfills. The promotion of financial incentives on discount given to customers who bring personal cup when purchased beverages was also highlighted, as was a message to encourage customers to use the reusable cups available in coffee shops (for the coffee shops that undertook that implementation measure). The knowledge of the quantity of plastic waste produced from disposable plastic cups was additionally highlighted.

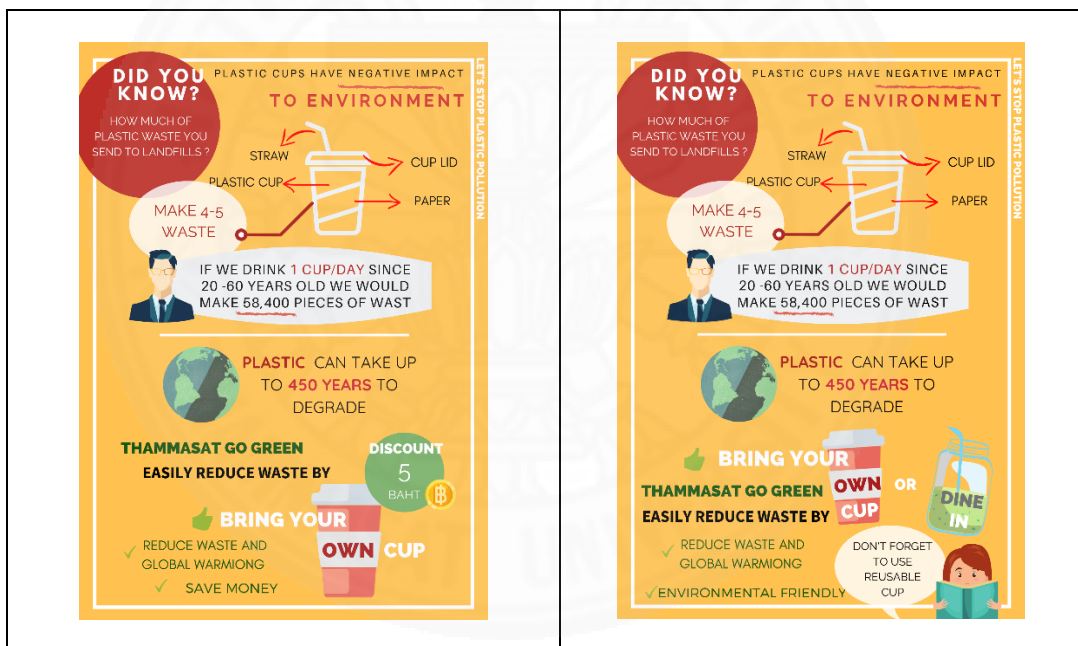


Figure 3.3 Posters used in this study (Thai version, in appendix A)



Figure 3.4 Environmental posters on display at the four study sites used for the field experiment (Coffee Corner, Fresh Fusion, True Coffee and Urbie)

The posters were placed in prominent areas within the coffee shops as show in Figure 3.4, such as: at the cashier point or order counter; in front of the coffee shops; and the beverage seasoning counter, with the poster being used as an intervention in this study.

3.4.2 Study Site Locations

The sample sites for this study are four coffee shops located at the centre of the Thammasat University, Rangsit campus.

The Coffee Corner and True Coffee shops already had financial incentives discounts of 5 Baht provided for customers who bring their own cups. Urbie is a coffee shop that does not have any financial incentives to encourage individuals to bring their own cups, but provides reusable cups for drink-ins, and Fresh Fusion does not have any financial incentives and does not provide reusable cups for drink-ins.

As part of the study design, the staff at the four participating coffee shops observed the rate of reusable cups used in their shops for 20 consecutive days prior to this study's intervention, and for 20 consecutive days after the environmental messages poster has been placed in them. The length of observation period and methodology undertaken in the Poortinga and Whitaker (2018) study in the U.K. was as follows: "capture ... drink sales for five consecutive weeks before and for five

consecutive weeks after the intervention (five weeks typically equated to 25 days of sales).” It was originally intended to have a similar investigation period to allow the researcher to more closely compare the findings of this present research with their findings. However, a shorter time period had to be used in this study as a result of the time limitations of this study and the agreements made with the collaborating coffee shops that cooperated in this study.

The four coffee shops being assessed are each located near a student centre where there they each receive a steady flow of customers all day which illustrate in Figure 3.5.

Coffee Corner is located opposite to the SC building, which is the main study building of campus and is attached to the sports centre. Urbie is located on the first floor of the Faculty of Learning Sciences and Education, which is attached to the Krom Luang Naradhiwas Rajanagarinda Learning Centre, and Fresh Fusion and True Coffee are located at the Puey Library.



Figure 3.5 The study site for this study

3.4.3 Data collection

Coffee shops managers and employees were asked to record their beverage sales for 20 consecutive days before and for 20 consecutive days after environmental messages posters were put in place. The data on the total number of

beverage drinks sold to individuals using personal reusable cups was collected daily on the format form created by researcher.

3.4.4 Data Analysis

The data collected from the four participating coffee shops consists of daily results for daily beverage drinks sold to individuals who brought their own personal reusable cups. The frequency of reusable cups used or quantity of reusable cups used is employed for use in this study instead of the proportion or quantity of reusable cups used because the numbers of beverages sold in each of the coffee shops are different. Thus determining the frequency rate allows the researcher to better compare the actual contexts. The independent variables are: the financial incentives; and the intervention of environmental messages. The independent variables were investigated for a set a period of time (20 days per phase).

3.4.5 Statistics

An independent sample T-test was employed to analyze the data collected from the coffee shops. The Independent sample T-test was used for the experimental research design, and used for evaluating the effects of interventions. The data used in this analysis was collected in the defined period of time with an intervention. The data used in this analysis consists of the daily beverages sold to those using their own personal reusable cups before and after the implementation of the intervention.

3.4.6 Limitations and Delimitations of Research

3.4.6.1 Scope

- 1) This study focuses only on takeaway beverage sales in coffee shops which significantly use single-use plastic cups.
- 2) It focuses on the use of reusable cups that customers bring to coffee shops.
- 3) The implemented measure on the availability of reusable cups in coffee shops is alternative measure undertaken with a collaborating coffee shop and was not introduced as a measure at all study sites.

4) The sample size is limited because the questionnaire survey data was collected only in collaborating coffee shops within the Thammasat, Rangsit campus.

3.4.6.2 Accessible Data

1) The actual numbers for the total sale of beverages drinks in coffee shops are confidential information due to business operation reasons.

2) Figures on the number of beverages sold to customers bringing their own reusable cups was collected for analysis in this research.

3.4.6.3 Spatial and Temporal

1) The environmental messages were only present at four corporate coffee shops. Thus, only a limited number of the total population of Thammasat University were exposed to them.

2) The environmental messages were only present at three corporate coffee shops. Thus, only a limited number of the total population of Thammasat University were exposed to them.

3) The surrounding events such as, environmental news, social media and other environmental campaigns, may also have influenced the customer behaviour in this research.

3.5 Customer survey

3.5.1 Population, Sample and Sampling Strategy for the Survey

3.5.1.2 Population assessed in this study

The population assessed in this study was comprised of students, faculty staff and administrators at Thammasat University who are drinks purchasers at coffee shops. The total population is unknown according to an uncertainty on the numbers of consumers in coffee shops that provide financial incentives in a campus.

The stakeholder in the education institute, the student body, is a group that is considered as the power of a nation which has high potential and is crucial for its development. Determining the government policy concerning youth, it

also recognises their importance as a valuable human resource that will further increase in value in the future. Thai youth development on behaviour and action for the environment is a key issue for both public and private organisations in which the government attempts to corporate and support the creation of environmental campaigns with the aim to provide youth with proper knowledge and understanding of the value of the environment to the citizen (DEQP, 2015).

The Thailand Master Plan for Solid Waste Management in the country (AD 2559-2564) has also identified the role of the Ministry of Education to: provide school administrators, policy makers and institutions with environmental information to help reduce the incidence of waste; enforce waste sorting and separation; create awareness and discipline in the youth related to these matters; become a knowledge center for the reducing, sorting and recycling of waste; and provide the curriculum and course work that incorporates knowledge on waste management for youth. It also provides incentives to schools and educational institutions that operate as learning resources in reducing and sorting of solid waste and hazardous waste (Chula Zero Waste, 2018).

3.5.1.3 Sample Size

The sample size of this study is taken with reference to the estimate number of 1,925 obtained with reference to the number of plastic cups used in coffee shops in Thammasat University's Rangsit campus. In particular, this study focuses on customers who buy drinks at coffee shops on the campus. Thus, sample size calculation for a study is retrieved from an unknown population which is calculated from Taro Yamane's formula. By taking 90% confidence level with $\pm 10\%$ precision and assumed the maximum variability, which is equal to 50% ($p = 0.5$). The formula that is used in this study is;

$$n = \frac{N}{1 + Ne^2} \quad (3.1)$$

where , n is the sample size

N = population size

e = Margin of error (MoE), the acceptable sampling error

Thus, representative sample size required for this study is calculated with $N = 1,925$ and $e = 0.1$

$$n = \frac{1,925}{1+(1,925 \times 0.1^2)} \quad (3.2)$$

$$= 95.062$$

So the sample size is equal to 95 samples and to avoid the error occurred from incomplete questionnaires the research will increase this figure by a further 15 samples to 110 samples. Thus, the total amount of the samples size is 110 samples. The researcher is focused on consumers who buy a drink in coffee shops. The sampling strategy in this study undertook convenience sampling in selecting the respondents.

3.5.2 Research instrument and measurement for survey

In this study, the questionnaire was selected to be a research instrument for gathering data. The questionnaire consisted of a closed-end questionnaire and an opened-end questionnaire. The structure of the questionnaire was composed of 4 sections which were as follows:

Section 1. Actual behaviours of respondents related to single-use plastic cup reduction in coffee shops. This part requires the background details of consumer drinking behaviour.

Section 2. Evaluate the measures and incentives provided by coffee shops in Thammasat University, Rangsit campus. This part investigates to what extent incentives measures influence respondents usage behaviour related to reusable cups.

Section 3. Attitude towards environmental awareness. This part investigates the level of pro-environmental behaviour and attitude of respondents towards the environmental awareness.

Section 4. Demographic information on respondents. The question requires information on gender, education level, occupation, and income which is taken using the closed-end checklist questionnaire. Data is divided into two different scales as follows (Table 3.1):

Table 3.1 Data measurement scale

Data	Data measurement using
Gender	Nominal Scale
Education level	Ordinal Scale
Occupation	Nominal Scale
Income	Ordinal Scale

For parts 1, 2 and 3 the closed-end question was used to design the questionnaire. The Rating scale was employed for measurement by referring to the Linkert-scale method to indicate the value of a measurement.

3.5.3 Data collection for questionnaire

In this study, the researcher selected paper-based questionnaires for gathering data from a sample group due to the convenience for respondents in answering and the accuracy of data analysis. The questionnaires were distributed to the sample group in Thammasat Rangsit campus.

3.5.4 Data Analysis

In order to further help answer the objectives of this study, a quantitative data survey from 110 respondents was collected, analyzed and interpreted using a statistical analytic computer program. Statistical Package for Social Science (SPSS) is the program the researcher used to analyze the statistical data. The results were analyzed to illustrate the overall picture of respondents who represent users of both reusable and single-use plastic cups.

3.5.5 Statistics

The statistical methods that were selected to analyze data from the surveys include:

3.5.5.1 Descriptive Analysis; which consists of frequency, standard deviations, percentage and mean comparison in the analysis of the data about the

behaviours that affect the decision to use reusable cups in coffee shops of the sample size and access their demographic data.

3.5.5.2 Inferential Statistics; which consists of factors analysis and Independent Sample t-Test. Factor analysis was used to categorize the variables factors that have the correlation into a smaller set of a summary factor. Cluster analysis was used to divide the data from the survey into groups (clusters) which were reusable cups users and single-use plastic cups users. The Independent Sample t-Test was used to analyze the different independent groups, demographic factors, and the behaviour related to the use of reusable cups..

3.6 Research Hypotheses

As mentioned earlier, this study investigates what factors affect customer's usage behaviour as related to their use of reusable cups for drinks purchased in coffee shops within the Thammasat University, Rangsit campus.

This research was specifically focused on two main groups of factors which were: financial incentives which were considered as economic factors that are external factors and environmental messages which were considered as internal individual motivational factors for experimental study.

The research was undertaken and analysed to identify both of these two main groups of factors to explore which factors are more effective and highly affect customers' usage behaviour on reusable cups in the campus. The research hypotheses developed for this study are as follows:

H_1 : Financial incentives can influence customer's usage behaviour on reusable cups use in coffee shops.

H_2 : Customers will take their reusable cups more often to coffee shops when there is: a persuasive environmental message about the number of plastic cups ending up in ocean or landfill and the negative consequences of such waste to the environment; and when they are specifically asked to bring their own reusable cups to the coffee shops. This is assessed in comparison to either of the combinations of providing financial incentives and non-financial incentives condition.

CHAPTER 4

RESEARCH FINDINGS AND RESULTS

The research results obtained from the short interviews, the field experiment and the customer surveys undertaken for this present research are analysed and discussed in this section. The short interviews were conducted with the owners and managers of 16 coffee shops in Thammasat University, Rangsit campus. The findings of this work are summarised as follows:

4.1 Secondary research

Climate change is a term that almost everyone on this planet is familiar with, but to what extent individuals know about it varies. According to the United Nations Framework Convention on Climate Change (United Nation, 1992), climate change is referred to as a change of climate which is caused by both direct and indirect human activity. It has become a world challenge to address it at the present time, and it is still developing its negative impact on our world faster than our efforts to deal with it. This issue is generally not well recognised by customers, and there is an only specific group of consumers that knows the impact of climate change. However, even with that group, this issue was seen as an irrelevant as most of them considered that the effect of climate change does not actually impact their daily life (Nimkitikul, 2016).

Due to an increase in the population, and the current poor general mindset with regards to sustainability, we use more and more resources to supply a rapidly growing population, with more people creating a higher demand for resources. There is presently a wide use of plastic in many industries to try and meet consumption requirements, due to its convenience and low-cost of investment, but this plastic takes more than 100 years to decompose (Jirawanchaikul, 2015).

Referring to Thailand's Pollution Control Department (PCD) statistics (PCD, 2018), there has been a continuous increase in plastic waste in Thailand, growing at a rate of 12% per year, equivalent to an annual increase around 2 million tonnes. Approximately 20% of this waste had been well managed and had been recycled, but

almost all of the remainder either ended up in landfill or the ocean create a negative impact to our planet.

Recently there has been a trend to reduce single-use plastic use across many countries. This trend is growing and individual countries have handled this issue through different ways from big scale initiatives, such as policy and taxes, through to smaller scale initiatives directed at the individual such as education and creating environmental awareness. As an example of a countrywide initiative, Rwanda has already launched a regulation at national scale to address this issue through prohibiting the production, import, use and sale of plastic bags (Danielsson, 2017).

In Thailand, there are only the collaboration campaigns held by the government and private sector, and no regulations that have been announced to reduce or ban single-use plastic issue. For instance, of the former, the Tourism Authority of Thailand (TAT) launched the environmental campaign to promoting responsible tourism the declaration scheme called 'Travel Thailand in Style, Reduce Plastic Waste'. This campaign aimed to promote the sense of environmental consciousness and encourage the responsible practice by promoting the use of reusable items such as reusable food and drink containers and utensils instead of foam and plastic utensils, and the use of cloth bags instead of plastic bags. Moreover, the campaign also encourages the service provider to provide the substitute material instead of plastic to customers (TAT Newsroom, 2018).

Plastic waste is a serious global issue that every sector has to be concerned about, with the dominant issue being the need to find effective solutions for decreasing the consumption rate of single-use plastic before it gets worse and causes even more severe impacts to our environment and economy. Education and rising customer awareness on this issue are importantly recognised as factors that can reduce plastic waste, and initiatives are often now undertaken an individual level to create the change that is required.

4.2 Short interviews

Sixteen short interviews were conducted with owners and managers in coffee shops in Thammasat University, Rangsit campus. From short interviews it was revealed that most coffee shops provide financial incentives for their customers to not use single-use cups.

There are presently 16 coffee shops that provide an area for sitting in at the Thammasat University, Rangsit campus. 15 of these undertake environmental measures aimed to reduce plastic waste created by single-use plastic cups. Details of the measures that they take are provided in Table 4.1

Table 4.1 Measures taken to reduce the number of disposable plastic cups provided by coffee shops in Thammasat University

Coffee shops	No financial incentive	Financial Incentives				Plastic cup fee	Reusable cups for dining in	Bio-plastic cups	Stamp (10 times get 1 free)
		Discount							
		2 Baht	3 Baht	5 Baht	10 Baht				
1. Fresh Fusion	✓								
2. Starbuck					✓				
3. Coffee Corner				✓					
4. D'Oro				✓	✓*				
5. Coffman				✓					
6. True Coffee					✓				
7. Amazon (Learning centre)				✓					

Table 4.1 Measures taken to reduce the number of disposable plastic cups provided by coffee shops in Thammasat University (Cont.)

Coffee shops	No financial incentive	Financial Incentives				Plastic cup fee	Reusable cups for dining in	Bio-plastic cups	Stamp (10 times get 1 free)
		Discount							
		2 Baht	3 Baht	5 Baht	10 Baht				
8. Solar Café				✓		✓	✓		
9. Café Muanchon				✓					
10. Miracle Coffee		✓						✓	
11. Intanin Coffee (Engineering Building)				✓			✓		
12. Intanin Coffee (SC Building)				✓			✓		
13. Amazon (Book store)				✓					
14. Urbie	✓						✓	✓	
15. ois Coffee			✓						
16. Café de Bloom		✓							

* *Special discount for D'Oro Cup only.*

Table 4.1 classifies the measures being taken into 5 groups which are: no financial incentives; financial incentives with subcategories of discount for bringing personal cup and charge cup fee for using plastic cup; the availability of reusable cups

for drink inside the coffee shop; use of bio-plastic cups; and a special stamp reward scheme for bringing a personal cup. Most of the coffee shops in Thammasat University have undertaken financial discounts to encourage customers to bring their own cups, with discounts ranging from 2 Baht to a maximum of 10 Baht for cost reduction per drink.

In some coffee shops, mostly franchises and well-known brands, they use bio-degradable cups instead of plastic cups in order to lessen the environmental impact from plastic cups and enhance their brand image as a green business that is concerned about both society and environment. In addition Thammasat University also take an action to encourage the use of paper cups in campus instead of plastic cups to reduce the generation of plastic waste within campus.

Reusable cups for drinking in coffee shops are also provided at Urbie and Solar Café which greatly reduces the use of plastic cups at those premises. This is especially so for Solar Café, as it has a financial incentive on plastic cups fee. The owner of Solar Café said that charging a plastic cups fee can encourage the customers to drink inside the shop and use the reusable cups that are available in the shop. Interestingly, the owner of Miracle Coffee said that providing a special stamp and giving discount to those who bring their own cup can boost the number of personal cups users, but this coffee shop also benefits from its location near the University dormitory, so it appears it is more convenient for individuals to bring their own cups to that shop rather than to the other coffee shops.

The measures mentioned above were selected to be used in this study as independent variables that influence the usage behaviour on reusable cups and were used to help shape and inform the development of the questionnaire.

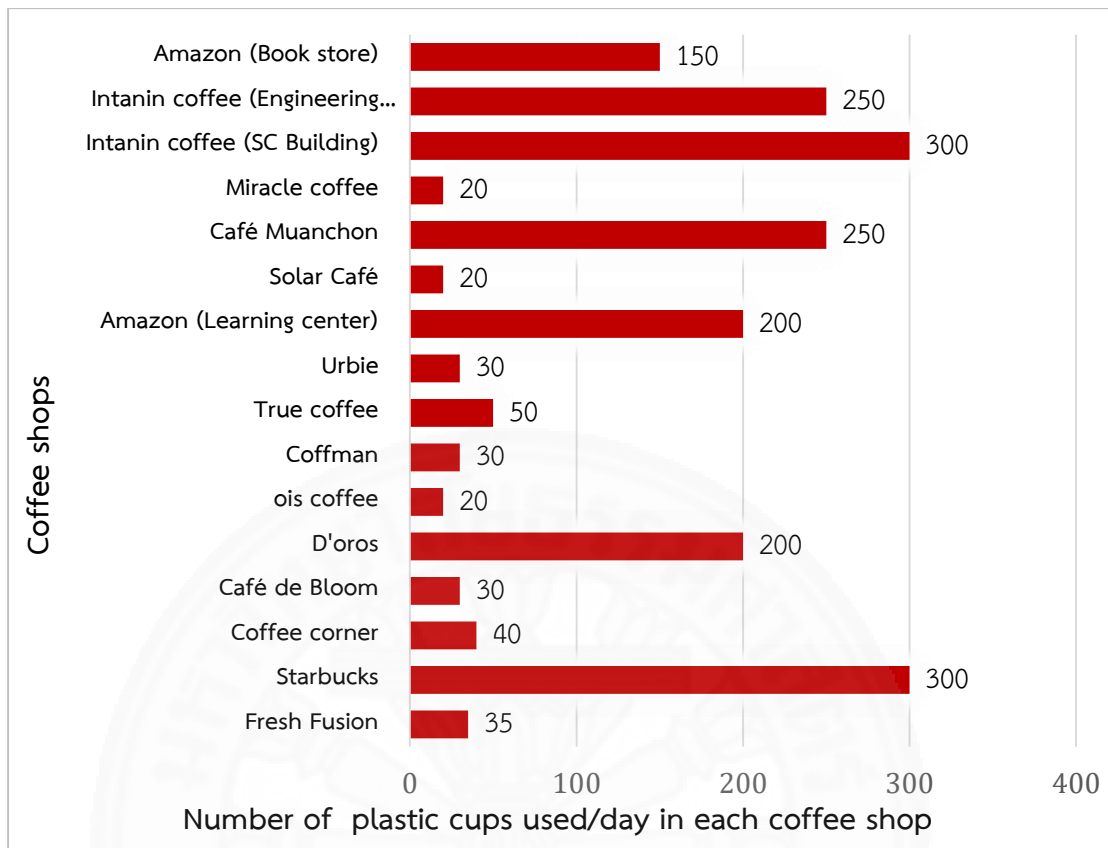


Figure 4.1 The average number of plastic cups used in each coffee shops per day.

Figure 4.1 shows the number of plastic cups used in each coffee shop located in Thammasat University, Rangsit. There are include the following 16 coffee shops: Amazon (in book store); Intanin coffee (Engineering building); Intanin Coffee (SC Building); Miracle Coffee; Café Muanchon; Solar Café; Amazon (Learning Centre); Urbie; True Coffee; Coffman; ois Coffee; D'Oro; Café de Bloom; Coffee Corner; Starbucks; and Fresh Fusion.

The estimated total plastic cups used in the above coffee shops is around 1,925 cups per day. The average use rate in each coffee shop ranges from 20 cups to 300 cups per day depending in large part on the number of customers that they have. The coffee shops that are franchises, or are branches of well-known brands such as Starbucks, Inthanin coffee and Amazon, were observed to have a higher average rate of plastic cups use when compared with other coffee shops that are in private ownership.

Generally, the rate of personal reusable cups use was very low when compared with the rate of plastic cups used. The estimated percentage of personal reusable cups used is not more than 5% of the total drinks sales each day.

4.3 Field experiment

The field study was undertaken with the cooperation of four coffee shop premises in the university campus which are: Coffee Corner; Fresh Fusion; Urbie and True Coffee. The field study investigated the potential influences of situations with and without financial incentives, and also the impact of the intervention of environmental messaging. Each period consisted of 20 consecutive days.

Table 4.2 The frequency of drinks sales with reusable cups at four coffee shops in Thammasat University before and after periods.

Study site	Environmental messaging	Provision of alternative	Financial incentive	Frequency of reusable cup/period		Impact on drink sell with reusable cup	
	Poster	Reusable cup available at coffee shop	Discount	Before (Average cup/day)	After (Average cup/day)	%	P-Value (Sig 2-tailed)
Coffee Corner	Y	N	Y	56 (2.8)	92 (4.6)	+ 64.3%	0.001
Fresh Fusion	Y	Y	N	24 (1.20)	135 (6.75)	+ 462.5%	0.000
Urbie	Y	N	N	16 (0.8)	21 (1.05)	+ 31.25%	0.478
True Coffee	Y	N	Y	68 (3.4)	99 (4.95)	+ 45.59%	0.000
Overall				164	347	+111.59%	0.000

Table 4.2 shows the frequency of drinks sales for those with reusable cups at four study sites both before and after periods of environmental messaging intervention. The study found that overall average drinks sales with reusable cups increased from 4.8 cups per days to 12.4 cups per days. Fresh Fusion revealed the biggest increase in drinks sales with reusable cups, as a result of the introduction of availability of reusable cups for sitting-in customers and the poster with the environmental message being placed in the shop. The average number of drinks sold with reusable cups rose up from 1.2 cups per day to 6.75 cups per day and the results of independent t-test analysis showed that it was significantly different from the previous period, and without reusable cups being made available in the coffee shop since the p-value represented 0.00 which is < 0.05 which is the standard p-value.

Coffee Corner introduced the environmental poster and a financial incentive of providing a 5 Baht discount for customers who bring their own reusable cups. This site has also observed an increase in reusable cups us, changing from an average of 2.8 cups per day to 4.6 cups per day, which had a p-value of 0.001 which is < 0.05 .

True Coffee introduced the environmental poster and a discount of 5 Baht for bringing a personal cup. This site shows a significant result in the differences between the two periods with the p-value of 0.000 which is < 0.05 . The average number of drinks sold with reusable cups increased from 3.4 cups per days to 4.95 cups per days.

The only site that did not show a significant change from the intervention of environmental poster placement is Urbie. Urbie represented a slight change from the previous period. This site introduced only the environmental poster in the shop. The results showed that the average drink sold to those with reusable cups increased from 0.8 cups/day to 1.05 cups per day. Therefore, the difference between before and after the intervention period is not significant since the p-value is 0.475 which > 0.05 .

4.3.1 Short interview after the intervention

After the intervention period where the environmental message poster was introduced, a short interview was conducted with coffee shops managers

and owners that cooperated in this study. The owner of Fresh Fusion said that the number of customers that bring their own reusable cups had increased from the previous period. Moreover, when there are reusable cups provided for sitting-in customers, the number of customer who reject single-used plastic cups increases. However, many customers are concerned about the use of their personal cups if they purchase drinks from a brand of coffee shop which is not the same brand as the coffee shop that they purchased their reusable cup from, and they are not sure if they are aware that they can use their personal cup or not. However, every coffee shop is willing to sell beverages to owners of any brand of reusable cup. Three of the coffee shops also promote the use of reusable cups by active communication. The managers and owners are asking their customer, especially regular customers, to bring their own personal cups or use reusable cups from the coffee shop to reduce the use of the single-use plastic cups. Therefore, the results from those coffee shops are all significantly different from the period before the intervention.

In addition, as a result of the customer survey it was revealed that a financial incentive on discount of more than 15 Baht was the option that the customers generally considered would most encourage them to bring and use their own reusable cups.

The following feedback was received from owners and staff at the participating coffee shops as related to financial incentives to reduce the use of single-use plastic cups at their premises:

For Fresh Fusion, the coffee shop which obtained the most significant results related to increased customer adoption of reusable cups, it was revealed that they were more willing to provide alternative reusable cup for customers' use in the coffee shop than the discount measure. This was because the owner was aware of the business profit issues related to giving a discount, as business operation expenses are quite high.

For Coffee Corner, the owner was willing to provide a discount that would still permit her to receive a decent profit from sale, but which was not more than the cost of single-use plastic cups, i.e. a discount not exceeding 5 Baht/cup. Additionally, she said that the discount provided should not affect her sale income

nor compromise her business. This is especially so as the 15 Baht discount is considered as a very high amount of money due to normal price of beverages in that coffee shop being around 35-50 Baht/cup. The owner did suggest, however, that if there is a supportive scheme from government or Thammasat University for such a discount they will be pleased to apply this measure.

For True Coffee, which is part of a large coffee chain, the staff said that there are already financial incentive measures and schemes put in place by its headquarters to reduce the use of disposable plastic cups which are not easily changed at individual sites. In their opinion, the proposed discount of more than 15 Baht is high when compared to the existing discount measure of 5 Baht per cup already in place in their coffee shop. They additionally mentioned that there are alternative measures that can be used to reduce the use of single-use plastic cups instead of providing the discount, such as changing to bio-degradable cups.

Urbie coffee shop already provided a 20% discount on selected drinks for customers who presented their student cards, so it is possible to provide financial incentives for those who bring their own reusable cups. However, the owner thought that the measure on providing the discount for bringing own reusable cups will not be effective as the number of customers who presently bring their own cups is very low. To reduce the use of single-use plastic cups, Urbie's owners use bio-degradable plastic cups instead of standard disposable plastic cups as this measure can reduce amount of plastic waste generated.

4.4 Quantitative Research Survey

The customer survey questionnaire (Appendix A) was distributed on the 7th of May 2019. The survey was finished on 11th May 2019, with its data being collected through a paper-based survey. The Statistic Package for Social Sciences (SPSS) program was selected to analyse the data. The survey questionnaire provided a sample size of 110 samples. There were 106 fully completed surveys. These were the only ones used for analysis and the rest, which were incomplete, were omitted.

Table 4.3 Summary frequency of drink purchase from coffee shops on campus

Times/week	Frequency (n)	Percentage (%)
Everyday	18	17
5-6 times/week	22	20.8
3-4 times/week	27	25.5
1-2 times/week	26	24.5
Less than once per week	13	12.3
Total	106	100.0

The results from the 106 respondents assessed were as follows: Section 1. Actual behaviours of respondents related to single-use plastic cup reduction in coffee shops. 27 respondents (25.5%) purchased beverages from coffee shops on campus 3-4 times/week, 26 respondents (24.5%) purchased beverages 1-2 times/week, and 22 respondents (20.8%) made purchases 5-6 times/week. 18 respondents (17%) made purchases every day, and only 13 respondents (12.3%) made purchases less than 1 time/week (as showed in Table 4.3).

Regarding the ownership of personal cups, there were 68 respondents (64.2%) that owned reusable cups, 38 respondents (35.8%) did not have any kind of reusable cup. The main types of personal reusable cups that the majority of individuals had was either a stainless cup/tumbler or a plastic cup/tumbler.

With regards to ownership of personal cups: stainless cup/tumblers were owned by 47 respondents (47.5%); 44 respondents (44%) owned personal plastic cups/tumblers; 7 respondents (7.1%) had silicone cups; and 1 respondent owned a ceramic reusable cup (as shown in Table 4.4).

Table 4.4 Classification of reusable cup types

Type of personal reusable cup	Frequency (n)	Percentage (%)
Plastic Cup/Tumbler	44	44.4
Stainless Cup/ Tumbler	47	47.5
Silicone Cup	7	7.1
Other	1	1
Total	99	100.0

Table 4.5 reveals that 36.8% (n=25) of the respondents who own reusable cups never bring their reusable cup when purchasing beverages at coffee shops. 27.9% (n=19) of them bring their reusable cup 1-2 times/week; 22.1% (n=15) bring their own cups for 3-4 times/week; 11.8% (n=8) always bring their own reusable cups when purchasing a beverage; and only 1.5% (n=1) bring their reusable cups 5-6 times/week.

Table 4.5 Summary of the level of personal reusable cup usage when purchasing beverages at coffee shops

Time/week	Own personal cups	Percentage (%)
Never use	25	36.8
1-2 times/week	19	27.9
3-4 times/week	15	22.1
5-6 times/week	1	1.5
Every time	8	11.8
Total	68	100.0

Table 4.6, investigating the relation between gender and reusable cup possession of respondents, reveals that males have a personal cup more often than females, 69.6% versus 61.7% (with a gender specific difference of around 7.9%). However, this study investigated only the customers in the coffee shops which are study sites on for this research. The results may differ from that result is all of the actual customers on the campus were assessed.

Table 4.6 The relation between gender and personal reusable cup possession.

Gender	Personal reusable cup		Total (%)
	Yes	No	
	Frequency (%)	Frequency (%)	
Male	16 (69.6)	7 (30.4)	23 (100)
Female	50 (61.7)	31 (38.3)	81 (100)
Transgender	1 (100)	0 (0)	1 (100)
Not disclosed	1 (100)	0 (0)	1 (100)
Total within reusable cup	68 (64.2)	38 (35.8)	106 (100)

Table 4.7 represents the reasons why respondents do not bring their own reusable cup when purchasing beverages in coffee shops. They were asked to rate the importance level of each reason ranging from unimportant to extremely important.

The results revealed that customers rated 'Forget to bring a reusable cup to the shop' as the top reason for them not bringing their own reusable cups to purchase drinks at coffee shops, with it achieving an average mean of 3.74 and being considered a very important factor. 'Reusable cup is difficult and inconvenient to carry' was ranked second with an average mean of 3.55. 'Single-use plastic is convenient to use' was the third ranked reason with an average mean of 3.35. This was followed by 'Using single-use plastic from the coffee shop is not needed as planning to purchase a drink was made in advance' with an average mean of 3.32. 'Single-use plastic is disposable' was next and received an average mean of 3.24. 'Reusable cup is inconvenient to maintain (cleaning cup)' received an average mean of 3.17, 'Single-use plastic is lightweight and easy to carry' scored an average mean of 3.10, 'Reusable cup has large size and heavy' got an average mean of 2.95, 'Free single-use plastic cup

provided' achieved an average mean of 2.75, 'Single-use plastic from the coffee shop is a more attractive design' received an average mean of 2.15, and the least important factor was 'Design and appearance of a reusable cup do not meet your preferences' which received an average of 1.85. Table 4.8 provides a summary these reasons for customers not bringing their own reusable cups when purchasing beverages in coffee shops.

Table 4.7 Summary of the reasons for not bringing own reusable cup when purchasing beverages in coffee shops.

Reasons	Total Mean (SD)	Interpretation	Rank
1. Free single-use plastic cup provided.	2.75 (1.30)	Quite Important	9
2. Single-use plastic is convenient to use.	3.35 (0.99)	Quite Important	3
3. Single-use plastic is lightweight and easy to carry.	3.10 (1.20)	Quite Important	7
4. Single-use plastic is disposable.	3.24 (1.31)	Quite Important	5
5. Single-use plastic from the coffee shop is a more attractive design.	2.15 (1.14)	Somewhat Important	10
6. Using single-use plastic from the coffee shop is not needed is planning to purchase a drink was made in advance.	3.32 (1.32)	Quite Important	4
7. Reusable cup has large size and is heavy.	2.95 (1.17)	Quite Important	8
8. Reusable cup is inconvenient to maintain (cleaning cup).	3.17 (1.25)	Quite Important	6

Table 4.7 Summary of the reasons for not bringing own reusable cup when purchasing beverages in coffee shops (Cont.)

Reasons	Total Mean (SD)	Interpretation	Rank
9. Reusable cup is difficult and inconvenient to carry.	3.55 (1.11)	Very Important	2
10. Forget to bring a reusable cup to the shop.	3.74 (1.15)	Very Important	1
11. Design and appearance of a reusable cup do not meet your preferences.	1.85 (0.98)	Somewhat Important	11

The Independent-sample T-test was used to analyze and compare the results between the two groups of respondents, those who have their own reusable cups and those who do not own reusable cups.

The results (Table 4.8) from the Independent-sample T-test shows that there are statistically significant differences for four reasons between the group of respondents who have their own reusable cups and the group that does not own reusable cups. The significant reasons are 'free single-use plastic cup provided' (p-value=0.012), 'single-use plastic from the coffee shop is a more attractive design' (p-value=0.067), 'reusable cup is inconvenient to maintain (cleaning cup)' (p-value=0.011), and 'reusable cup is difficult and inconvenient to carry' (p-value=0.016). Therefore, those who do not own reusable cups tend to have higher means than those that do for those criteria. Obviously, the reusable cup possession group have less concern about carrying and maintaining their own reusable cups than the other group.

Table 4.8 Reasons for not bringing own reusable cup when purchasing beverages in coffee shops – Independent Sample T-test

Reasons	Have reusable cup	No reusable cup	P-Value (Sig 2-tailed)	Significance
	Mean (SD)	Mean (SD)		
1. Free single-use plastic cup provided.	2.53 (1.34)	3.16 (1.13)	0.012	S
2. Single-use plastic is convenient.	3.29 (1.11)	3.45 (0.72)	0.392	N.S
3. Single-use plastic is lightweight and easy to carry.	3.13 (1.23)	3.05 (1.14)	0.744	N.S
4. Single-use plastic is disposable.	3.15 (1.37)	3.39 (1.18)	0.352	N.S
5. Single-use plastic from the coffee shop is a more attractive design.	2.00 (1.18)	2.42 (1.00)	0.067	S
6. Using single-use plastic from the coffee shop is no need to previously plan to purchase a drink.	3.28 (1.39)	3.39 (1.20)	0.668	N.S
7. Reusable cup has large size and heavy.	2.88 (1.19)	3.08 (1.15)	0.411	N.S
8. Reusable cup is inconvenient to maintain (cleaning cup).	2.94 (1.33)	3.58 (0.98)	0.011	S
9. Reusable cup is difficult and inconvenient to carry.	3.35 (1.23)	3.89 (0.76)	0.016	S
10. Forget to bring a reusable cup to the shop	3.78 (1.16)	3.66 (1.15)	0.604	N.S
11. Design and appearance of a reusable cup are not your preferences.	1.75 (1.00)	2.03 (0.94)	0.167	N.S

Table 4.9 Represents the reasons why respondents bring their own reusable cups when purchasing beverages in coffee shops. The result shown that 'Reduces single-use plastic waste' obtained the highest mean at 4.13 which is rated as a very important reason. 'Keeps drinks hot/cold' received an average mean of 3.87. 'Financial incentive, for example get a discount or charge 5 Baht/cup' received an average mean of 3.52, 'Get reward points/stamps to collect for a gift/discount' got an average mean of 3.19, 'Attractive Design' received an average mean of 2.89 and 'Trendy' obtained the lowest average mean of 1.91.

Respondents were not concern too much to be on trend, but tended to pay attention on minimising their use of plastic waste and the properties of reusable cup that can keep drink hot/cold for a longer period of time. This was followed by financial factors which are: discount, charge and reward that possibly make them to bring their own reusable cup.

Table 4.9 Summary of the reasons for bringing own reusable cups when purchasing beverages in coffee shops.

Reasons	Total Mean (SD)	Interpretation	Rank
1. Financial incentive. For example, get a discount or charge 5 Baht/cup.	3.52 (1.21)	Very Important	3
2. Reduces single-use plastic waste	4.13 (0.81)	Very Important	1
3. Attractive Design	2.89 (1.17)	Quite Important	5
4. Keeps drinks hot/cold.	3.87 (0.97)	Very Important	2
5. Get reward points/stamps to collect for a gift/discount.	3.19 (1.12)	Quite Important	4
6. Trendy	1.91 (0.96)	Somewhat Important	6

When comparing the means between those who own reusable cups and those who do not possess reusable cups on reasons why respondents bring their own cups when purchasing beverages in coffee shops: interestingly, the independent-sample T-test (Table 4.10) showed that there was no significant difference between these two groups as all p-values are over 0.1, except for one of the reasons, trendy, which show a different level of significance with a p-value of 0.025.

Even though 'Trendy' received the lowest total average mean, there are differences in results between the two groups. The reusable cup possession group has a lower average mean than those that do not possess reusable cups at 1.75 and 2.18 respectively. So those who do not own reusable cups are more concerned about trends.

Table 4.10 Reasons for bringing own reusable cup when purchasing beverages in coffee shops for those owning reusable cups – Independent Sample T-test

Reasons	Have reusable cup	No reusable cup	P-Value (Sig 2-tailed)	Significance
	Mean (SD)	Mean (SD)		
1. Financial incentive. For example, get a discount or charge 5 Baht/cup.	3.54 (1.25)	3.47 (1.13)	0.774	N.S
2. Reduces single-use plastic waste	4.19 (0.82)	4.03 (0.79)	0.315	N.S
3. Attractive Design	2.96 (1.28)	2.76 (0.94)	0.378	N.S
4. Keeps drinks hot/cold.	4.00 (1.01)	3.63 (0.85)	0.708	N.S
5. Get reward points/stamps to collect for a gift/discount.	3.26 (1.29)	3.05 (1.09)	0.371	N.S
6. Trendy	1.75 (0.92)	2.18 (0.98)	0.025	S

On the other hand, when investigating the relation of the reason for bringing their reusable cup when purchasing beverages in coffee shops as related to gender, a statistic difference was revealed related to 'Financial incentive' (Table 4.11). For example, for 'Get a discount or charge 5 Baht/cup', female respondents showed a higher average mean than males. Thus, it can indicate that females are influenced by financial incentives more than males in this situation. Males also shows a slight difference in 'Keeps drinks hot/cold' and 'Trendy' but not significantly so in statistical analysis as the p-value is more than 0.1. However, a male might be influenced by function and present trends in some way to use a personal cup.

Table 4.11 Reasons for bring own reusable cup when purchasing beverages in coffee shops as related to gender – Independent Sample T-test

Reasons	Average mean within gender		P-Value (Sig 2-tailed)	Significance
	Male (n=23)	Female (n=81)		
1. Financial incentive. For example, get a discount or charge 5 Baht/cup.	2.90	3.70	0.018	S
2. Reduces single-use plastic waste	4.00	4.16	0.404	N.S
3. Attractive Design	2.65	2.93	0.384	N.S
4. Keeps drinks hot/cold.	3.91	3.83	0.708	N.S
5. Get reward points/stamps to collect for a gift/discount.	2.96	3.25	0.385	N.S
6. Trendy	2.00	1.88	0.673	N.S

Section 2. Evaluation of the measures and incentives provided by coffee shops in Thammasat University, Rangsit campus.

From table 4.12, the summarisation of each factor that encourages the respondents to reduce their use of single-use plastic cups when purchasing beverages in coffee shops, reveals that 'Financial discount is given when bringing your own cup' received the top rank at the average mean of 4.04. 'Cleaning service available for your

personal cup’ received the second rank with average mean of 3.86. ‘Availability of reusable cups in coffee shops’ received an average mean of 3.64. ‘Sell reusable cups in shops and offer a special discount when using them’ got an average mean of 3.56. Reasons with an average mean of over 3.50 are all considered very influential in the rating scale used. ‘Persuade consumers by donating some profit to environmental projects when they do not use single-use plastic cups’ and ‘Providing environmental knowledge of negative impacts of plastic waste on the environment’ each received the same average mean of 3.48. ‘Offer bonus points/stamps when bringing personal cup’ got an average mean of 3.45. ‘Persuasive campaign from an influencer such as a famous celebrity’ received the lowest average mean at 2.78.

Respondents rated financial incentives on discount as very influential with the highest average mean, meanwhile charging a cup fee for plastic cup was found to be very influential being ranked third. So both kinds of financial incentives, discount and charge, can influence respondents to reduce their use of single-use plastic cups. Interestingly, having a cleaning service available for your personal cup was the factor that was ranked second. This possibly indicates that having cleaning service for personal cups can further encourage people to use their own personal cups when purchasing beverages in coffee shops.

Table 4.12 Summary the factors that encouraged the reduction in use of single-use plastic cups when purchasing beverages in coffee shops.

Factors	Total Mean (SD)	Interpretation	Rank
1. Offer bonus points/stamps when bringing personal cup	3.45 (0.95)	Quite Influential	6
2. Charge a cup fee for each drink sold with a single-use plastic cup.	3.64 (1.11)	Very Influential	3
3. Persuade consumers by donating some profit to environmental projects when they do not use single-use plastic cups.	3.48 (1.09)	Quite Influential	5

Table 4.12 Summary the factors that encouraged the reduction in use of single-use plastic cups when purchasing beverages in coffee shops (Cont.)

Factors	Total Mean (SD)	Interpretation	Rank
4. Sell reusable cups in shops and offer a special discount when using them.	3.56 (1.08)	Very Influential	4
5. Availability of reusable cups in coffee shops.	3.64 (1.10)	Very Influential	3
6. Cleaning service available for your personal cup.	3.86 (1.20)	Very Influential	2
7. Financial discount is given when bringing your own cup.	4.04 (0.93)	Very Influential	1
8. Persuasive campaign from an influencer such as a famous celebrity.	2.78 (1.03)	Quite Influential	7
9. Providing environmental knowledge of negative impacts of plastic waste on the environment.	3.48 (1.24)	Quite Influential	5

According to the t-test results of respondents' attitude and perception towards factors that encourage them to reduce their use of single-use plastic cups when purchasing beverages in coffee shops (Table 4.13), there were three statistically significant differences found. These were: 'Availability of reusable cups in coffee shops' with a p-value of 0.013; 'Financial discount is given when bringing your own cup' with a p-value of 0.065; and 'Providing environmental Knowledge of negative impacts of plastic waste on the environment' with a p-value of 0.049. As all of these reasons have p-values < 0.1 they show a significant difference.

Reusable cup possession has a higher significant mean for all 3 reasons than non-reusable cup possession. Therefore, the reusable cup possession group are easier to influence with regards to reducing the use of plastic cups.

Table 4.13 The factors that encouraged reduction in the use of single-use plastic cups when purchasing beverages in coffee shops for individuals already owning reusable cups – Independent Sample T-test

Reasons	Have reusable cup	No reusable cup	P-Value (Sig 2-tailed)	Significance
	Mean (SD)	Mean (SD)		
1. Offer bonus points/stamps when bringing personal cup.	3.44 (1.01)	3.47 (0.83)	0.866	N.S
2. Charge a cup fee for each drink sold with a single-use plastic cup.	3.66 (1.06)	3.61 (1.20)	0.802	N.S
3. Persuade consumers by donating some profit to environmental projects when they do not use single-use plastic cups.	3.59 (1.14)	3.29 (0.98)	0.177	N.S
4. Sell reusable cups in shops and offer a special discount when using them.	3.53 (1.17)	3.61 (0.92)	0.730	N.S
5. Availability of reusable cups in coffee shops.	3.84 (1.09)	3.29 (1.37)	0.013	S
6. Cleaning service available for your personal cup.	3.96 (1.24)	3.68 (1.12)	0.265	N.S
7. Financial discount is given when bringing your own cup.	4.16 (0.84)	3.82 (1.04)	0.065	S
8. Persuasive campaign from an influencer such as a famous celebrity.	2.82 (1.39)	2.71 (1.11)	0.649	N.S
9. Providing environmental Knowledge of negative impacts of plastic waste on the environment.	3.65 (1.32)	3.18 (1.04)	0.049	S

Table 4.14 Represents the result from respondents on financial factors more likely to influence the use personal reusable cups. The financial factor that received the highest mean is 'Get 15 Baht discount for purchasing beverage' with an average mean of 4.29, which is interpreted as potentially using own personal reusable cup if this measure is applied by a coffee shop. This was followed by 'Get more than 15% discount for purchasing the beverage' with an average mean of 4.28, and 'Get 15% discount for purchasing the beverage' with an average mean of 3.95, 'Get 15 Baht discount for purchasing beverage' with an average mean of 3.92. 'Charge more than 15 Baht for plastic cup' received an average mean of 3.80 and was fifth in rank, and 'Charge 15 Baht for plastic cup' was ranked sixth in terms of desirability with an average mean of 3.61. 'Get 5 Baht discount for purchasing the beverage' received the lowest mean of 2.91.

Therefore, financial incentive on discount were found to be more preferable for respondents than introducing charges for the use of single-use plastic cups, with the higher benefit received from saving money being the more preferable option. However financial incentive on charge also received the high average mean when concerned with the loss of their money as the 'Charge more than 15 Baht for plastic cup' was ranked second.

Table 4.14 Summary of the financial factors towards likeliness of using a personal reusable cup.

Financial Factors	Total Mean (SD)	Interpretation	Rank
1. Get 5 Baht discount for purchasing the beverage.	2.91 (1.19)	Maybe use	11
2. Get 10 Baht discount for purchasing beverage.	3.45 (1.16)	Maybe use	8
3. Get 15 Baht discount for purchasing beverage.	3.92 (1.10)	Potentially use	4

Table 4.14 Summary of the financial factors towards likeliness of using a personal reusable cup (Cont.)

Financial Factors	Total Mean (SD)	Interpretation	Rank
4. Get more than 15 Baht discount for purchasing the beverage.	4.29 (1.10)	Potentially use	1
5. Get 5% discount for purchasing the beverage.	3.04 (1.25)	Maybe use	10
6. Get 10% discount for purchasing the beverage.	3.48 (1.21)	Maybe use	7
7. Get 15% discount for purchasing the beverage.	3.95 (1.10)	Potentially use	3
8. Get more than 15% discount for purchasing the beverage.	4.28 (1.09)	Potentially use	2
9. Charge 5 Baht for plastic cup.	3.29 (1.25)	Maybe use	9
10. Charge 10 Baht for plastic cup.	3.45 (1.37)	Maybe use	8
11. Charge 15 Baht for plastic cup.	3.61 (1.50)	Potentially use	6
12. Charge more than 15 Baht for plastic cup.	3.80 (1.56)	Potentially use	5

From table 4.15, the result from independent sample T-tests show that only two financial factors are statically significantly different among the two groups, reusable cup possession and non-possession of reusable cups. These two financial factors are ‘Charge 10 Baht for plastic cup’ and ‘Charge 15 Baht for plastic cup’ with p-values of 0.097 and 0.08 respectively, both factors have a p-value of less than 0.1.

Reusable cup owners tend to use their own personal cups more when there are financial incentives on charges related to single-use plastic cup fees, meanwhile those who do not own reusable cups tends to agree less about financial incentive measures.

Table 4.15 The financial factors toward likely to encourage personal use of reusable cups by those who already have reusable cups – Independent Sample T-test.

Financial Factors	Have reusable cup	No reusable cup	P-Value (Sig 2-tailed)	Significance
	Mean (SD)	Mean (SD)		
1. Get 5 Baht discount for purchasing the beverage.	2.99 (1.22)	2.76 (1.15)	0.360	N.S
2. Get 10 Baht discount for purchasing beverage.	3.54 (1.18)	3.29 (1.11)	0.279	N.S
3. Get 15 Baht discount for purchasing beverage.	3.94 (1.13)	3.89 (1.06)	0.836	N.S
4. Get more than 15 Baht discount for purchasing the beverage.	4.34 (1.09)	4.21 (1.12)	0.567	N.S
5. Get 5% discount for purchasing the beverage.	3.09 (1.28)	2.95 (1.21)	0.580	N.S
6. Get 10% discount for purchasing the beverage.	3.50 (1.26)	3.45 (1.11)	0.830	N.S
7. Get 15% discount for purchasing the beverage.	3.93 (1.16)	4.00 (0.99)	0.743	N.S
8. Get more than 15% discount for purchasing the beverage.	4.29 (1.11)	4.26 (1.08)	0.890	N.S
9. Charge 5 Baht for plastic cup.	3.41 (1.28)	3.08 (1.17)	0.190	N.S
10. Charge 10 Baht for plastic cup.	3.62 (1.34)	3.16 (1.39)	0.097	S

Table 4.15 The financial factors toward likely to encourage personal use of reusable cups by those who already have reusable cups – Independent Sample T-test (Cont.)

Financial Factors	Have reusable cup	No reusable cup	P-Value (Sig 2-tailed)	Significance
	Mean (SD)	Mean (SD)		
11. Charge 15 Baht for plastic cup.	3.81 (1.41)	3.26 (1.61)	0.084	S
12. Charge more than 15 Baht for plastic cup.	3.97 (1.48)	3.50 (1.69)	0.155	N.S

Section 3. Attitude towards Environmental awareness.

This part investigates the level of pro-environmental behaviour and attitude of respondents towards the environmental awareness. The result (Table 4.16) shows that respondents have high environmental awareness in all statements. ‘Environmental problems are often caused by human activities’ received the highest mean at 4.73, followed by ‘Solving plastic waste issues is everyone’s responsibility’ which received an average mean of 4.71. ‘The current situation is that the negative impacts of environmental issues are rapidly increasing’ received an average mean of 4.63. ‘Single-use plastic items (such as plastic cups, bags, straws) have a negative impact on the environment’ got an average mean of 4.61. ‘Plastic waste is one of the most important environmental issues in Thailand’ received an average mean of 4.51. ‘Environmental issues have severe impacts on our country’ got an average mean of 4.48. ‘I support and help persuade people to reduce the use of single-use plastic’ received an average mean of 4.36. ‘I often buy products made from degradable or recyclable materials’ obtained an average mean of 3.85. The lowest average mean is ‘I often try to avoid purchasing or using products that will have a negative impact on the environment such as single-use plastic’ which received an average mean of 3.76.

The respondents all agreed with the environmental statement, meanwhile pro-environmental behaviour on buying and using environmentally friendly product, and supporting the reduction of single-use plastic use received lower results.

Table 4.16 Summary of attitude towards environmental awareness

Sentences	Total Mean (SD)	Interpretation	Rank
1. Environmental issues have severe impacts on our country.	4.48 (0.59)	Agree	6
2. The current situation is that the negative impacts of environmental issues are rapidly increasing.	4.63 (0.54)	Strongly agree	3
3. Environmental problems are often caused by human activities.	4.73 (0.51)	Strongly agree	1
4. Plastic waste is one of the most important environmental issues in Thailand.	4.51 (0.56)	Strongly agree	5
5. Single-use plastic items (such as plastic cups, bags, straws) have a negative impact on the environment.	4.61 (0.58)	Strongly agree	4
6. I often buy products made from degradable or recyclable materials.	3.85 (0.79)	Agree	8
7. I often try to avoid purchasing or using products that will have a negative impact on the environment such as single-use plastic.	3.76 (0.76)	Agree	9
8. Solving plastic waste issues is everyone's responsibility.	4.71 (0.59)	Strongly agree	2
9. I support and help persuade people to reduce the use of single-use plastic.	4.36 (0.78)	Agree	7

Comparing the results between the two groups of respondents, which are reusable cup possession and non-reusable cup possession on attitude toward environmental awareness. The independent sample T-test result (Table 4.17) revealed that there was not a statistically different respondent attitude towards environment awareness between the two groups, except on the 'I support and help persuade

people to reduce the use of single-use plastic' statement. This statement has a p-value < 0.1 so it is shown as a significant difference between those who own and those who do not own reusable cups.

The reusable cup possession group had a higher mean of support and help towards persuading people to reduce their use of single-use plastic than those who did not possess reusable cups. So this possibly means that respondents who have reusable cups tend to have more pro-environmental behaviour than non-reusable cup users.

Table 4.17 Attitude toward environmental awareness with regards to reusable cup possession – Independent Sample T-test.

Sentences	Have reusable cup	No reusable cup	P-Value (Sig 2-tailed)	Significance
	Mean (SD)	Mean (SD)		
1. Environmental issues have severe impacts on our country.	4.54 (0.56)	4.37 (0.63)	0.142	N.S
2. The current situation is that the negative impacts of environmental issues are rapidly increasing.	4.68 (0.53)	4.55 (0.56)	0.124	N.S
3. Environmental problems are often caused by human activities.	4.75 (0.50)	4.68 (0.53)	0.525	N.S
4. Plastic waste is one of the most important environmental issues in Thailand.	4.53 (0.56)	4.47 (0.56)	0.623	N.S
5. Single-use plastic items (such as plastic cups, bags, straws) have a negative impact on the environment.	4.66 (0.56)	4.53 (0.60)	0.250	N.S
6. I often buy products made from degradable or recyclable materials.	3.79 (0.82)	3.95 (0.73)	0.341	N.S

Table 4.17 Attitude toward environmental awareness with regards to reusable cup possession – Independent Sample T-test (Cont.)

Sentences	Have reusable cup	No reusable cup	P-Value (Sig 2-tailed)	Significance
	Mean (SD)	Mean (SD)		
7. I often try to avoid purchasing or using products that will have a negative impact on the environment such as single-use plastic.	3.84 (0.77)	3.63 (0.75)	0.182	N.S
8. Solving plastic waste issues is everyone's responsibility.	4.78 (0.51)	4.58 (0.68)	0.120	N.S
9. I support and help persuade people to reduce the use of single-use plastic.	4.47 (0.76)	4.16 (0.79)	0.048	S

Section 4. Demographic information on respondents.

The gender characteristics of respondents were as follows: 76.4 % (n = 81) were female, 21.7 % (n= 23) were male, 0.9 % (n = 1) were transgender, and 0.9 % (n= 1) did not disclose gender (as showed in Table 4.18).

Table 4.18 Gender information of respondents

Gender	Frequency (n)	Percentage (%)
Male	23	21.7
Female	81	76.4
Transgender	1	0.9
Not disclosed	1	0.9
Total	106	100.0

The majority of participants were aged between 18-23 years old, equivalent to 85.9% (n = 91). The actual age groupings for that age band were as follows: 26

people were 20-year-olds, the largest sub-set of that group. The next subset in terms of size were the 19-year-olds which was comprised of 20 individuals. There were 18 people who were 22-years-old, 16 who were 21-years-old, 9 who were 23-years-old and 2 individuals who were 18-years-old. Individuals who were between 24-31 years old comprised 10.3% of the sample (n = 11), those aged less than 18-years-old and those over 32-years-old each represented 1.8% (n =2) of the sample set.

The result is related to the total number of students in campus, for which there are more females than males. Females account for 63.45% of all students and males account for 36.5%, respectively.

Table 4.19 Age summary of respondents

Age (years old)	Frequency (n)	Percentage (%)
Less than 18	2	1.9
18-23	91	85.9
23-31	11	0.9
More than 31	2	1.9
Total	106	100.0

With regards to educational level, those studying for a bachelor's degree were the largest component of the sample, contributing 89 persons (84 %) from the total data set. Bachelor's degree or equivalent and Master degree each contributed the same number of persons, 7 (6.6 %), followed by those with an educational degree below bachelor degree which contributed 2 persons (1.9 %). There was 1 person (0.9 %) at PhD level.

Table 4.20 Summary of the education level data on respondents

Education level	Frequency (n)	Percentage (%)
Below bachelor	2	1.9
Studying bachelor	89	84.0
Bachelor or equivalent	7	6.6
Master	7	6.6
PhD	1	0.9
Total	106	100.0

In terms of occupation, the highest percentage of respondents were students, at 92.5% (n = 98), followed by 2.8% (n = 3) who were business owners, private company employees and freelancers were each at 1.9% (n = 2); and 1 respondent (0.9 %) was a University professor.

Table 4.21 Summary of the occupation data of respondents

Occupation	Frequency (n)	Percentage (%)
Student	98	92.5
Employee	2	1.9
Business owner	3	2.8
Freelance	2	1.9
University Professor	1	0.9
Total	106	100.0

Regarding average personal income per month, the majority of the respondents, 72.6% (n=77), had an income of less than or equal to 15,000 Baht monthly.

Table 4.22 Summary of average personal income of respondents

Average personal income (Baht)	Frequency (n)	Percentage (%)
≤ 15,000	77	72.6
15,001 - 30,000	21	19.8
30,001 - 45,000	4	3.8
45,001 - 60,00	2	1.9
60,001 – 75,000	1	0.9
More than 75,001	1	0.9
Total	106	100.0

Next were those who had incomes of 15,001-30,000 Baht, which represented 19.8% (n=21), then there was 3.8% (n= 4) who had average personal incomes of 30,001 - 45,000 Baht, and then 1.9% (n=2) who received 45,001 - 60,000 Baht. Those that had incomes of 60,001 – 75,000, and those that had incomes of more than 75,000 Baht found to have a similar percentage at 0.9% (n=1).

4.5 Key findings from this study's research results

1) The estimated percentage of personal reusable cups used at the sites assessed is representative of not more than 5% of the total drinks sales each day.

2) The most effective measure found to increase the use of reusable cups in this study was the combination of availability of reusable cups in coffee shops and the presence of an environmental message poster.

3) The encouragement given by staff/owners of coffee shops for customers to use reusable cups has been shown to have a significant impact on the reusable cups use behaviour of customers.

4) Customers are often unsure if they can still receive a discount on drinks if they purchase them from a brand of coffee shop which is not the same brand as the coffee shop that they purchased their reusable cup from. This is due to insufficient information on this issue being provided in coffee shops.

5) A supportive scheme from government and/or University is needed to better promote the use of reusable cups, such as the subsidising the provision of reusable cups and providing appropriate financial incentives to customers.

6) Respondents rated financial incentives on discount as very influential with the highest average mean, meanwhile charging a cup fee for plastic cups, which was also found to be very influential, was ranked third.

7) Financial incentives on discount were found to be more preferable for respondents than introducing charges for the use of single-use plastic cups, with the higher benefit received from saving money being the more preferable option. However financial incentive on charge also received the high average mean when concerned with the loss of their money as the 'Charge more than 15 Baht for plastic cup' option was ranked second.

8) Having a cleaning service available for personal cups was the factor that was ranked second. This possibly indicates that, apart from the financial factor, having cleaning service for personal cups can further encourage people to use their own personal cups when purchasing beverages in coffee shops.

9) The results from the customer surveys undertaken in this work reveal that reducing their contribution to plastic waste is the main factor that influences customers to use reusable cups at Thammasat University's Rangsit campus. It was also revealed that females significantly exhibited a higher preference for the financial incentives when bringing their own cups.

10) Males significantly exhibited a lower preference for financial incentives provided by coffee shops, but tended to be more aware of the properties and function of reusable cups that can keep drinks cold for a longer period of time.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion for field experiment study

This study investigated a number of different measures that can be taken to encourage to the use of reusable cups instead of single-use plastic cups in coffee shops. The field experiment was conducted at four coffee shops at the Thammasat University, Rangsit campus. Each of the coffee shops was provided with an environmental message poster and a different combination of measures were undertaken at them over a twenty-day period. The study found that the environmental message poster effectively increased the use of reusable cups when combined with other measures: the availability of reusable cups in coffee shops; and a discount for bringing a personal cup. Only providing an environmental message did not show a significant effect. The most effective measure found to increase the use of reusable cups in this study was the combination of availability of reusable cups in coffee shops and the presence of an environmental message poster.

According to the results from field study (Figure 5.1), showing the proportion of drink sales made with reusable cups at the four study sites both before and after the intervention; three of the four coffee shops assessed exhibited a significant change in customer habits as a result of the intervention. Those coffee shops were Coffee Corner, Fresh Fusion and True Coffee. Only Urbie, the coffee shop that exhibited the poster but did not provide financial incentives, did not present any significant change after the intervention.

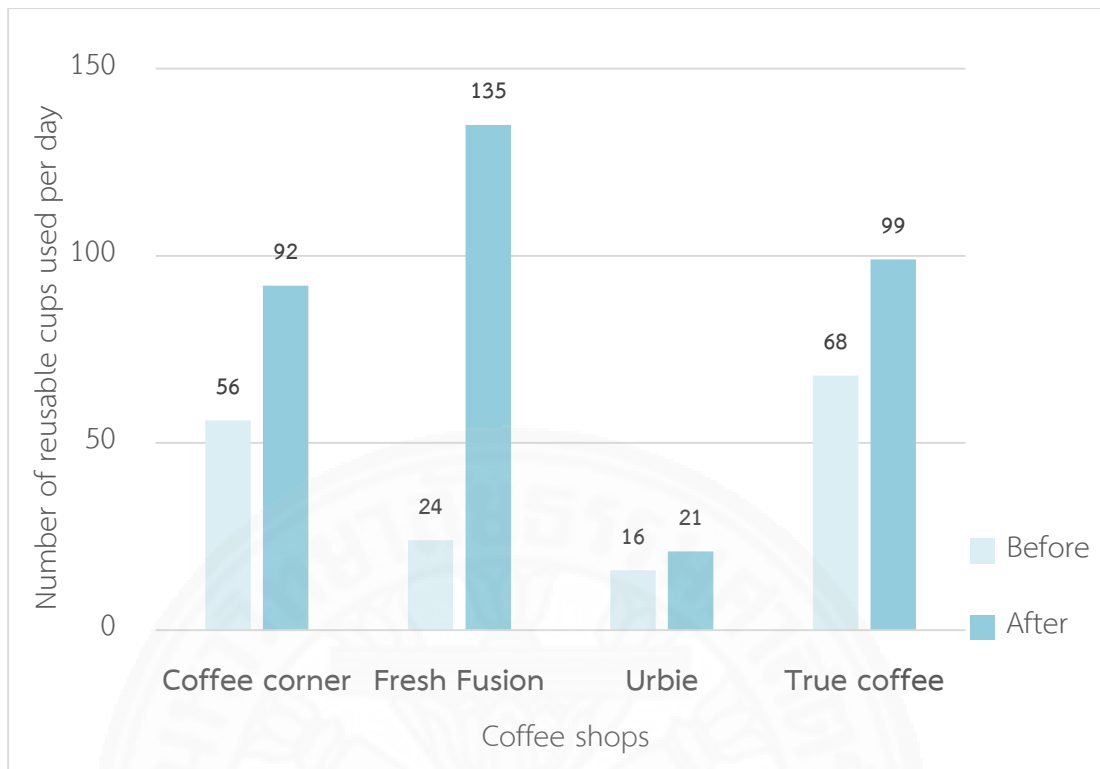


Figure 5.1 The proportion of drink sales with reusable cups at the four study sites before and after intervention

The availability of the alternative of a reusable cup for use plays an important role in altering customer behaviour to reject the use of single-use plastic cups. This result is similar to the finding in the Poortinga and Whitaker (2018) study that was conducted in the UK. Moreover, the result from that work reported that a charge on reusable cups could help to promote the use of reusable cups more than a discount for bringing personal cups which had been indicated as not being very effective. The authors of that study suggest that customers are more likely to appreciate avoiding paying a charge on single-use plastic cup than receiving the benefit from a discount for bringing a personal cup.

The only coffee shop that did not show a significant change in the use of single-use plastic cups in this present study is the one that introduced only the environmental poster in its premises.

According to the results of this present study, the benefits gained from doing good things for the environment needs to address promoting the use of reusable

cups, even though the perceived loss in financial terms of using single-use plastic cups might be a more effective kind of financial incentive. Having a charge on a disposable cup might make customers more aware of the extra costs that they have to pay when using a single-use plastic cup, similar to the charge on plastic bags that has been introduced in convenience stores in Thammasat University. The introduction of a charge on plastic bags has resulted in a significant change in their use. For example, both Chulalongkorn University and Thammasat University collaborate with 7-11 and other convenience stores within their university campuses to reduce the use of plastic bags by requiring a charge of 2 Baht per single-use plastic bag. The results from Chula Zero Waste campaign reveal that this measure has reduced the distribution of plastic bags from around 70,200 bags to 16,700 per month, a 76% reduction from the previous period. Before having a charge on plastic bags, the Chula Zero Waste project also promoted the use of reusable bags and distributed reusable bags for free, the result of that measure also reduced the use of plastic bags compared to before such measures were taken up, and achieved a 40% reduction. After charging 2 Baht on plastic bags, it revealed the even greater results were achieved in terms of reduction. Thammasat University has also achieved effective results as well, with a reduction of up to 143,500 single-use bags being achieved in one month alone (MGR Online, 2018).

The researcher suggests that a charge on disposable cups might lead to a greater behaviour change when undertaken along with the use of environmental message posters. However, a charge on the single-use plastic cup was not applied and investigated in this present study as the collaborating coffee shops did not agree to undertake this measure. The coffee shops were mostly concerned about potential business benefits and losses from undertaking this measure.

After the intervention, short interviews were conducted with the coffee shop managers and owners. It was revealed that the environmental message and financial discount measure to encourage the customer to bring a personal cup to purchase a drink is more effective when there is active communication by staff on this issue. The staff in coffee shops can provide more information about the environmental poster and the benefits of bringing or using a reusable cup. This helps the customer more easily access the information provided and become more aware of the negative

impacts of using single-use plastic cups. In addition, the customer may better realise the benefits gained from bringing their own reusable cup when buying a drink.

Even though the measure of increasing the availability of alternative reusable cups for customers reveals the greatest increase in use of reusable cups by customers, there were some customer concerns voiced about possible hygiene issues related to the cleanliness of the reusable cups provided for sitting-in customers. They thought that a single-use plastic cup is cleaner than alternative cups provided in coffee shops. This is an odd perception for people to have, particularly as the re-use of other items related to food and drink such as glasses, knives, forks, spoons, bowls and plates is considered the norm in the food and drink industry, even in high-class establishments.

In fact, the more we consume the single-use plastic the more we generate plastic waste that negatively impacts the environment as related to land, sea and marine life. Moreover, this plastic waste breaks down into microplastics that contaminate the human food chain and water supplies, thereby affecting both ourselves and our health. The recent study from University of Newcastle, in Australia revealed that people actually inadvertently ingest an average of 5 grams of plastic every week, which is equal to the weight of a credit card (Gerretsen, 2019). There have also been concerns raised by experts over the potential long-term health effects of such high levels of ingestions (Dalberg, 2019).

According to this present field experiment study,, it can be concluded that financial incentive on discount measures can encourage the use of reusable cups in coffee shops on campus when compared to the number of reusable cups used in situations where there are no financial incentives given in coffee shops. The number of reusable cups used in each site increased when there was a combination of environmental messages and incentives. The use of a reusable cup was higher when introducing the measures of availability of alternative reusable cups, such as reusable cups being provided by the shops for those who were sitting in. However, the coffee shops are better able to provide a clear condition of financial incentive on discount to make the customer understand this measure.

The effectiveness of measures was investigated at coffee shops within the Thammasat University, Rangsit campus. The result is limited and relatively small in scale as the measures were undertaken at a limited number of coffee shops, at four sites, in Thammasat. The range and extent of interventions that could be taken was also restricted which limited the extent of what could be investigated. The main interventions used in the field study were the placement of an environmental message poster inside participating premises and implementing other measures depending on the coffee shop. The effectiveness of the environmental message poster may also have been possibly influenced by external factors, such as social media, environmental news, and other environmental campaigns around the study time of intervention.

5.2 Conclusion for customer survey

According to customer survey research and data analysis, the results reveal that single-use plastic cups were used and discarded at a rate of at least 1,925 cups/day. This number is solely the number of single-use cups collected from all coffee shops within the campus, and does not include those from street coffee shops and canteens. The results from customer surveys reveal that reducing their contribution to plastic waste is the main factor that influences customers to use reusable cups at Thammasat University's Rangsit campus. The function and properties of the reusable cup are also considered as important reasons. The customers thought that the function of a reusable cup that can keep the drink cool or hot for a longer time influences their usage behaviour more, especially the male customers. The summary of measures that encourage customers to reduce their use of single-use plastic cups when purchasing beverages in coffee shops within the campus reveals that the most preferred option is a financial incentive on discount while a charge on the use of single-use plastic cups is less preferred by customers.

Regarding the result of financial incentive measures to encourage the customer to be more likely to bring a personal cup to purchase a drink, a discount of more than 15 Baht for purchasing the beverage is the option most preferred by customers themselves. Additionally, a discount of 5 Baht was the least preferred

option from the customers' perspective. So the effects of the financial incentive on discount to promote the use of reusable cup in the coffee shops will effectively work when the customers realise the proper benefits gained from using personal cups. Otherwise, they tend to not be aware of these measures. The charge on single-use plastic cups tends to receive less preference from the customer. This may be related to the prospect theory, a model of decision making under risk, which presents that human is always more aware of losses rather than gain, and prefer an alternative choice where they will surely gain benefit (Kahneman and Tversky, 2013).

The average number of respondents from this study that use reusable cups when purchasing beverages in this study undertaken at the Thammasat University, Rangsit campus, is more than for the Chula Zero Waste, my cup project, with the results from this study being 13.6% higher. The customer survey in this study data was collected after the intervention period using the environmental posters. According to Chula Zero Waste, there are 50.3% of respondents that never use a reusable cup when purchasing a beverage at coffee shops (Chula Zero Waste, 2019). Meanwhile, the data collected from this study revealed that there were 36.8% of respondents who never bring personal cups to buy a drink. However, this study has limitations in its sample size as it takes data only from customers at its research sites.

5.3 Recommendations to reduce the use of single-use plastic

This study suggests a guideline for stakeholders, such as coffee shops, entrepreneurs, customers, product designers, campaigners, universities, government and relevant related sectors, to develop measures and solutions to reduce the use of single-use plastic cups and promote awareness of waste reduction.

5.3.1 Campaign for each gender

According to data collected from customers, males significantly exhibit a lower preference for the financial incentive provided by coffee shops, but tend to be aware of the properties and function of reusable cups that can keep drinks cold for a longer time. A trend also influences male's usage behavior of the reusable

cups too, even though these two reasons are not present as significant in statistical terms from independent simple T-test results.

Therefore, it is proposed that a campaign directed more specifically at males should prominently advertise the added performance features of reusable cups, such as the function of being able to keep drinks cool for 24 hours, the easy way to maintain them and the best quality of materials used to make them, also the high quality of reusable cups can avoid the risk of drips from plastic cups holding cold drinks sweating and getting on computers or student work, in order to better attract male interest.

Additionally, this study suggests that the presenter(s) of advertising should be an influential person, or persons; famous singers like BNK48, or famous football players. For females, the campaigner and designer should concentrate on both the design of reusable cups and the promotion provided in coffee shops. The design of reusable cups should be trendy, comfortable to carry, and beautiful. The pattern of the reusable cups may be inspired by famous fashion brands, and their appearance may be designed to be more attractive, and not similar to the design of regular reusable cups in the present market. It is proposed that both types of gender specific information should be provided (possibly on separate sides of a poster).

Moreover, the coffee shop should release interesting promotions to motivate this group of customers to bring their own reusable cups to purchase a drink. For example, providing a 'Buy 1 get 1 free' coupon every selected day for the customers who bring their own personal cups, or having a regular raffle that only those who bringing their own cups can participate in to get a chance to win a free drink. Properly planned, such measures can provide benefit for both customers and coffee shops as it can entice the customer to come back more often to purchase their beverages again. It will also enable the customers to get a free drink from using reusable cups and also feel good about helping save the environment.

5.3.2 Charge on single-use plastic cups

Data from the field study and customer survey revealed that financial incentives on discount can motivate customers to bring their own reusable cups, especially for the female customer. From the questionnaire results, it was revealed

that providing benefits via discounts when customers bring their own reusable cups is a tempting measure for customers. Nevertheless, it is proposed that stronger financial incentives on the charge on single-use plastic cups should be established to promote the use of reusable cups within the university. In order to make customers aware that there are alternatives to using disposable plastic cups, a charge for single-use plastic cups should have proper value, not be too little and not too expensive, to make the customer more aware of extra cost and make them seek to avoid paying extra money for plastic cups. A charging measure has already widely revealed the success of reducing the distribution of plastic bags in convenience stores through adopting such an approach (Jirawanchaikul, 2015).

Having said that, if undertaken incorrectly, a charge on single-use plastic cups fee may cause a negative impact on coffee shops due to the customer will have a negative notion toward participating coffee shops if some other coffee shops may still provide free single-use plastic cups for them. To make it more effective and sustainable, the government should set a regulation to reduce the use of disposable plastic cups by increasing the tax on plastic cups and setting a charge fee on disposable plastic cups in coffee shops when provided to customers instead of permitting their free distribution. Such a measure could also be independently undertaken at university campus level, with all coffee shops on campus being required by university administrations to charge customers agreed fee levels for the use of single-use plastic cups.

5.3.3 Reusable cups for rent

According to the customer survey, forgetting to bring reusable cups to buy drinks is the most critical barrier to reducing the use of single-use plastic cups. Difficulty and inconvenience related to carrying reusable cups are also significant barriers that make customers not want to use them. To address these issues, this study recommends an alternative solution to encourage the customer to reduce their use of single-use plastic cups by providing reusable plastic cups for rent. The deposit and return scheme has already been widely introduced in the rental business. An example is the Co-Cup pilot project, a project launched in Ireland by Dublin City University and Trinity College Dublin and also undertaken in cooperation with the government sector

and the Dublin city council. That scheme lets people use reusable cups, instead of single-use plastic cups, from collaborating coffee shops when purchasing a drink. They stop providing disposable cups to customers, and only make available the reusable cups for rent. The customer pays a deposit on a reusable cup of €1, and they receive their money back when they return their reusable cup at a collaborating coffee shop. The reusable cups are washed and cleaned by the coffee shops, so the next time customers purchase a drink, they can use the clean cup (DCU, 2019).

The CupRite is another case study for the reusable cup rental service in coffee shops. This application was developed by a startup from Los Angeles on Indiegogo, a fundraising platform. Customers that use CupRite application can rent and drop their used reusable cups at different coffee shops within 15 days after the rental date. The CupRite also provides a discount to purchase a drink in partner coffee shops (Deng, 2019).

This idea is beneficial for customers both at university locations and at other business sites, as customers would not have to carry their own reusable cups anymore, which would make things more easy and convenient for them. The reusable cups rental service can also encourage the behavioural change on customers and increase their involvement with the reusable culture, which relates to a circular economy concept, with no waste being produced from this system. The easy accessibility to an alternative choice or substitute product can make people more likely to change behaviour (encouraging pro-environmental behaviour), as reported in Poortinga and Whitaker, 2018).

5.3.4 Communication and education

Active communication is strongly suggested to help encourage people to use reusable cups. The staff in coffee shops should help provide information about the benefits that will be gained from using reusable cups instead of single-use plastic cups and help persuade customers to bring their own reusable cups when purchasing beverages. Implementing knowledge dissemination on the disadvantages of disposable cups would create more significant results on single-use plastic cups reduction behaviour. The spread of environmental knowledge can educate individuals from the academic sector and the private sectors, such as in classes or schools, and

the general public via various media like news, documentary, social media; Facebook pages and websites. Good education and knowledge can encourage pro-environmental behaviour from insight, as it can enhance values and positive perceptions at individual level concerning environmental issues. With regard to the questionnaire survey results on customer attitudes toward environmental awareness, people tend to realise that their daily activities can often cause environmental problems. However, only a few people have pro-environmental behaviours, with others still purchasing and using products that will have a negative impact on the environment, such as single-use plastics.

5.3.5 Staff training programs

As it has already been demonstrated in this work that the staff in coffee shops can play an important role in encouraging the customers to bring their own cups when purchasing beverages; it is proposed that they should be given free active communication and sustainability education lessons in order to enable them to encourage more customers to do the right thing and not use single-use plastics. They can help empower customers to be greener in the decisions they take.

5.3.6 Alternative materials

Instead of using disposable plastic cups in coffee shops, bio-degradable plastic cups can be used as an alternative which creates lesser impact on the environment and is more eco-friendly. Bio-degradable plastic cups are mostly made from renewable resources, such as corn and potato which can decompose in natural environment after use. Paper cups also present an alternative that can degrade in environment but a lot of the natural resources are consumed in their production (Evans, 2018).

Switching from single-use plastic cups to biodegradable cups, or paper cups, are one of the measures that coffee shops can take to reduce their contributions to plastic waste streams. However, using biodegradable products still generates waste in the environment even though they are compostable.

5.3.7 Distribution of free reusable cups in university

According to Poortinga and Whitaker (2018) study, they found that the distribution of free reusable cups to students at the University of Winchester revealed

a highly positive result on student usage behaviour with regards to reusable cups. Moreover, a charge on single-use plastic cups was implemented in the canteen of that university after the distribution of free reusable cups, which led to a further increase in reusable cups usage by students after that intervention. Furthermore, in Ireland, the county town of Monaghan promotes pro-environmental behaviour with regards to waste reduction to their citizens by distributing reusable cups all over its county. Reusable cups are distributed to participating coffee shops and government service centers with environmental posters. The project can successfully encourage people's awareness of waste reduction and promote the use of reusable cups (Local Authority Prevention Network, n.d.).

From these case studies, it is indicated that the distribution of free reusable cups in university can encourage customers to use reusable cups. Despite that, the quality and appearance of reusable cups have also been shown to importantly influence customer usage behaviour, a further factor that needs to be taken into consideration. The availability of infrastructure and services for washing and cleaning the reusable cups also have to be considered and invested in, in order to help create sustainable change with regards to reduction in single-use plastics.

5.3.8 Supportive schemes from private, government and public sectors.

Apart from suggesting financial incentives (discounts) to encourage customers to use their own reusable cups at coffee shops, the author of this study suggests that additional supportive schemes and measures need to be considered for both coffee shops and customers to encourage and enable an increased reduction in the use of disposable plastic cups and other single-use plastics.

It is proposed that the government should provide business benefits to those shops that neither use nor provide single-used plastic cups to customers. This could be done through providing tax breaks, and/or through providing subsidies on cups made of more environmentally-friendly materials (paper cups and bio-degradable cups), helping fund re-usable cup initiatives, and better increasing awareness of what can be done. It could also lay down legislation that coffee shops must provide reusable cups for all those that are taking their drinks inside the shops.

In order to encourage customers who are taking their drinks out of the shops after purchase to use reusable cups (either their own reusable cups or multi-use cups that are part of a return scheme), the government and public sector should, in addition to providing financial incentives, provide exclusive offers to those who use such cups. As an example, coffee shops chains which are affiliates of a big company, might offer promotions for other activities or special discount coupons for purchasing goods.

As this study specifically investigated the effectiveness of different methods to increase the use of reusable cups for purchased beverages at the Thammasat University Rangsit campus, the researcher proposes that, in particular, the University Authority might wish to consider introducing a mandatory campus-wide 15 Baht charge for the purchase of all drinks in single-use containers. [As mentioned earlier, this is the favoured financial incentive that customers think most likely to increase the highest levels of change and encourage pro-environmental behaviour but it could not be effectively undertaken without university support].

The university could also as part of such an overall initiative make available both rentable reusable drinks containers which are returnable to any shop selling drinks on-site, and provide one-off free thermal drinks containers to all staff and pupils at the campus which drink shops will wash for free before use. It is suggested that monies made from the charge for single-use plastics could go to charities involved in reversing the damage caused by plastic waste.

Another alternative is to provide financial support for coffee shops to use the more expensive biodegradable single-use cups instead of cheaper single-use plastic cups, and offer privileges to those who use reusable cups when purchasing their beverages in campus. As part of a rewards scheme, privileges given for purchasing beverages with reusable cups a set number of times might include: vouchers for free printing at university facilities; discounts for purchasing goods at the university book store; and parking privileges on campus.

In conclusion, it is hoped that the recommendations provided in this study may lead to successful and effective measures to reduce use of single-use plastic cups and increase sustainability awareness. It is hoped in particular that the

recommendations made will be of use for Thammasat University as part of its vision and drive to create a sustainable university. It is suggested that the distribution of free reusable cups within the university campus, the introduction of a reusable cups for rent scheme and the setting of an increased set minimum charge for the use of single-use plastic cups by university authorities would contribute greatly in helping achieve significant reduction in plastic waste creation within the campus. It is also suggested from the findings of the pilot study undertaken as part of this present work, that the placement of relevant environmental message posters in coffee shops on campus, in conjunction with such measures will further increase their effectiveness and motivate beneficial behaviour change.

It is recommended that additional research should be urgently undertaken to further investigate the effectiveness of different financial incentives and initiatives as outlined above, in order to reduce the use of single-use plastics for drinks. The potential effectiveness of environmental message posters in conjunction with the reusable cups initiatives should also be investigated further. In particular, the present researcher suggests that special attention could be paid to how providing a message with a dominant social norm description (Goldstein et al., 2008) might further help drive motivation.

It is also proposed that the measures and suggestions made here could be trialed in a wider variety of settings, including coffee shops outside university campuses, in order to create and refine guidelines to enable the successful long-term reduction of plastic waste and increased levels of environmental sustainability.

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APPENDICES

APPENDIX A

ENVIRONMENTAL POSTERS (THAI VERSION)

LET'S STOP PLASTIC POLLUTION

DID YOU KNOW? แก้วพลาสติกส่งผลกระทบต่อสิ่งแวดล้อม

ช่วงชีวิตหนึ่งของคุณสร้างขยะมากแค่ไหน?

น้ำ 1 แก้ว สร้างขยะ 4-5 ชิ้น

หลอด

ฝาครอบ

แก้วพลาสติก

กระดาษ

หากเราดื่มน้ำวันละ 1 แก้ว/วัน ตั้งแต่ อายุ 20-60 ปี จะ สร้างขยะมากถึง **58,400** ชิ้น

พลาสติกใช้เวลาในการย่อยสลายมากถึง **450 ปี**

ร่วมกันสร้างธรรมชาติสีเขียว
ลดขยะง่ายๆ แค่พกแก้วมาเอง

ลด 5 บาท

BRING YOUR OWN CUP

✓ ลดขยะ ลดโลกร้อน

✓ ประหยัดเงินในกระเป๋า

LET'S STOP PLASTIC POLLUTION

DID YOU KNOW?

ช่วงชีวิตหนึ่งของคุณสร้างขยะมากแค่ไหน?

น้ำ 1 แก้ว สร้างขยะ 4-5 ชิ้น





หากเราดื่มน้ำวันละ **1 แก้ว/วัน** ตั้งแต่อายุ 20-60 ปี จะ สร้างขยะมากถึง **58,400 ชิ้น**



พลาสติกใช้เวลาในการย่อยสลายมากถึง 450 ปี !

ร่วมกันสร้างธรรมชาติสีเขียว ลดขยะง่ายๆ แค่พกแก้วและหลอดมาเอง/ รับประทานในร้าน



BRING YOUR OWN CUP OR DINE IN

ไม่ใช่แก้วพลาสติกดียังไง?

- ✓ ลดขยะพลาสติก ลดโลกร้อน
- ✓ ประหยัดทรัพยากร
- ✓ เป็นมิตรต่อสิ่งแวดล้อม

นั่งอ่านหนังสือ/ทำงาน อย่าลืมใช้แก้วในร้านนะคะ



APPENDIX B

QUESTIONNAIRE

Topic: Investigation of the effectiveness of different methods to increase the use of reusable cups for purchased beverages at a University Campus in Thailand.

Background information

• This survey forms part of the student research requirement for the Master's Program in Design, Business & Technology Management undertaken at the Thammasat University, Rangsit campus. **Your participation in this survey is greatly appreciated.**

Survey Participant Instructions

• This questionnaire seeks to find out the relationship between attitudes toward environmental issues related to plastic waste and behaviour related to the use of reusable cups for drinks purchased in the coffee shops in the Thammasat University Rangsit campus. It has been created in order to investigate and evaluate the effectiveness of measures provided by those coffee shops related to the use of such cups.

• This survey will require approximately 5-10 minutes to complete. Please correctly answer all the questions to the best of your ability. Your responses shall be kept confidential.

Part 1: Actual behaviours of respondent related to single-use plastic cup reduction in coffee shops.

1. How often do you purchase beverages from coffee shops on campus?

- Everyday
- 5-6 times/week
- 3-4 times/week
- 1-2 times/week
- Less than once per week

2. Do you have your own reusable cup?

Yes

No (If your answer is no skip to question 5.)

3. If you have your own reusable cup(s), what kind of reusable cup do you have?

(You can answer more than one choice)

Plastic Cup/Tumbler

Stainless Cup/ Tumbler

Silicone Cup

Other: _____

4. How often per week do you bring your personal reusable cup when purchasing beverages at coffee shops?

Never

1-2 times/week

3-4 times/week

5-6 times/week

Everytime

5. Please rate the reason why you would “**NOT** BRING YOUR OWN REUSABLE CUP” when purchasing beverages in Coffee shops?

Reason	Unimportant	Fairly Important	Quite Important	Very Important	Extremely Important
1. Free single-use plastic cup provided.					
2. Single-use plastic is convenience.					
3. Single-use plastic is lightweight and easy to carry.					
4. Single-use plastic is disposable.					
5. Single-use plastic from the coffee shop is a more attractive design.					
6. Using single-use plastic from the coffee shop is no need to previously plan to purchase a drink.					
7. Reusable cup is large in size and heavy.					

5. Please rate the reason why you would “**NOT** BRING YOUR OWN REUSABLE CUP” when purchasing beverages in Coffee shops? (Cont.)

Reason	Unimportant	Fairly Important	Quite Important	Very Important	Extremely Important
8. Reusable cup is inconvenient to maintain (cleaning cup).					
9. Reusable cup is difficult and inconvenient to carry.					
10. Forget to bring a reusable cup to the shop					
11. Design and appearance of a reusable cup are not your preferences.					

6. Please rate the reasons why you would “BRING YOUR OWN REUSABLE CUP” when purchasing beverages in Coffee shops

Reason	Unimportant	Fairly Important	Quite Important	Very Important	Extremely Important
1. Financial incentive. For example, get a discount or charge 5 Baht/cup					
2. Reduces single-use plastic waste.					
3. Attractive Design					
4. Keeps drinks hot/cold.					
5. Get reward points/stamps to collect for a gift/discount.					
6. Trendy					

Part 2: Evaluate the measures and incentives provided by coffee shops at Thammasat University, Rangsit campus.

7. How influential are each of the following factors in encouraging you to “MINIMISE THE USE OF SINGLE-USE PLASTIC CUPS” when purchasing beverages in Coffee shops?

Factor	Not influential	Fairly Influential	Quite Influential	Very Influential	Extremely influential
1. Offer bonus points/stamps					
2. Charge a cup fee for each drink sold with a single-use plastic cup.					
3. Persuade consumers by donating some profit to environmental projects when they do not use single-use plastic cups.					
4. Sell reusable cups in shops and offer a special discount when using them.					

7. How influential are each of the following factors in encouraging you to “MINIMISE THE USE OF SINGLE-USE PLASTIC CUPS” when purchasing beverages in Coffee shops? (Cont.)

Factor	Not influential	Fairly Influential	Quite Influential	Very Influential	Extremely influential
5. Availability of reusable cups in coffee shops.					
6. Cleaning service available for your personal cup.					
7. A financial discount is given when bringing your own cup.					
8. Persuasive campaign to reduce single-use plastic cup from an influencer such as a famous celebrity.					
9. Environmental Knowledge of negative impacts of plastic waste on the environment					

8. To what extent would the following make you “**likely to use your own reusable cup**” when purchasing beverages at the coffee shop?

Factor	Not use	Not likely to use	Maybe use	Potentially use	Definitely use
1. Get 5 Baht discount for purchasing the beverage.					
2. Get 10 Baht discount for purchasing beverages.					
3. Get 15 Baht discount for purchasing beverages.					
4. Get more than 15 Baht discount for purchasing the beverage.					
5. Get 5% discount for purchasing the beverage.					
6. Get 10% discount for purchasing the beverage.					
7. Get 15% discount for purchasing the beverage.					
8. Get more than 15% discount for purchasing the beverage.					

8. To what extent would the following make you “likely to use your own reusable cup” when purchasing beverages at the coffee shop? (Cont.)

Factor	Not use	Not likely to use	Maybe use	Potentially use	Definitely use
9. Charge 5 Baht for a plastic cup.					
10. Charge 10 Baht for a plastic cup.					
11. Charge 15 Baht for a plastic cup.					
12. Charge more than 15 Baht for a plastic cup					

Part 3: Attitude towards Environmental awareness.

9. To what extent do you “agree” with the following sentences?

Sentences	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Environmental issues have severe impacts on our country.					

9. To what extent do you “agree” with the following sentences? (Cont.)

Sentences	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
2. The current situation is that the negative impacts of environmental issues are rapidly increasing.					
3. Environmental problems are often caused by human activities.					
4. Plastic waste is one of the most important environmental issues in Thailand.					
5. Single-use plastic items (such as plastic cups, bags, straws) have a negative impact on the environment.					
6. I often buy products made from degradable or recyclable materials.					
7. I often try to avoid purchasing or using products that will have a negative impact on the environment.					

9. To what extent do you “agree” with the following sentences? (Cont.)

Sentences	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
8. Solving plastic waste issues is everyone’s responsibility.					
9. I support and help persuade people to protect the environment.					

Part 4: General information about the respondent

1. Gender

Male Female Transgender Not disclosed.

2. Age _____

3. What is your education level?

Below Bachelor Bachelor or equivalent Master PhD.

4. What is your occupation?

Student Government Officer Business Owner

House-wife/House-husband Employee Freelance

Other (please state)

5. Average Income per month

- ≤ 15,000 Baht
- 15,001-30,000 Baht
- 30,001-45,000 Baht
- 45,001-60,000 Baht
- 60,001 – 75,000 Baht
- More than 75,000 Baht



.....Many thanks for your participation

APPENDIX C

STATISTIC TEST ON FIELD STUDY- INDEPENTDANT SAMPLE T-TEST

Coffee corner- Independent Samples T-Test

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
SUM 1	20	5.30	1.780	.398
2	20	2.80	1.542	.345

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
SUM	Equal variances assumed	.737	.396	4.747	38	.000	2.500	.527	1.434	3.566
	Equal variances not assumed			4.747	37.246	.000	2.500	.527	1.433	3.567

Fresh Fusion- Independent Samples T-Test

Group Statistics

Group2	N	Mean	Std. Deviation	Std. Error Mean
Sum2 1	20	6.75	3.127	.699
2	20	1.20	1.542	.345

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Sum2	Equal variances assumed	10.417	.003	7.119	38	.000	5.550	.780	3.972	7.128
	Equal variances not assumed			7.119	27.730	.000	5.550	.780	3.952	7.148

Urbie - Independent Samples T-Test

Group Statistics

	Group3	N	Mean	Std. Deviation	Std. Error Mean
Sum3	1.00	20	1.0500	1.27630	.28539
	2.00	20	.8000	.89443	.20000

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower		Upper
Sum3	Equal variances assumed	.446	.508	.717	38	.478	.25000	.34849	-.46549	.95549
	Equal variances not assumed			.717	34.036	.478	.25000	.34849	-.45820	.95820

True coffee - Independent Samples T-Test

Group Statistics

	Group4	N	Mean	Std. Deviation	Std. Error Mean
Sum4	1.00	20	4.9500	.00000	.00000
	2.00	20	3.4000	.00000	.00000

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower		Upper
Sum4	Equal variances assumed	22.014	.000	7.878E+15	38	.000	1.55000	.00000	1.55000	1.55000
	Equal variances not assumed			7.878E+15	38.000	.000	1.55000	.00000	1.55000	1.55000

Total - Independent Samples T-Test

Group Statistics

	groupall	N	Mean	Std. Deviation	Std. Error Mean
sumall	1.00	80	4.3375	2.77634	.31040
	2.00	80	2.0500	1.58713	.17745

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower		Upper
sumall	Equal variances assumed	10.798	.001	6.398	158	.000	2.28750	.35754	1.58132	2.99368
	Equal variances not assumed			6.398	125.652	.000	2.28750	.35754	1.57991	2.99509

APPENDIX D

CUSTOMER SURVEY STATISTIC

Independent Samples Test – Regarding to reasons for not bring own reusable cup when purchasing beverages in coffee shops

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	90% Confidence Interval of the Difference	
								Lower	Upper
Not use1	5.374	.022	-	104	.016	-.628	.257	-1.056	-.201
			2.442	88.298	.012	-.628	.245	-1.036	-.221
Not use2	5.180	.025	-.766	104	.445	-.153	.200	-.485	.179
			-.859	101.327	.392	-.153	.178	-.449	.143
Not use3	.882	.350	.328	104	.744	.080	.243	-.324	.483
			.336	81.983	.738	.080	.238	-.315	.475
Not use4	1.581	.211	-.936	104	.352	-.248	.265	-.687	.192
			-.978	87.087	.331	-.248	.253	-.669	.173
Not use5	.426	.515	-	104	.067	-.421	.228	-.799	-.043
			1.850	87.685	.056	-.421	.217	-.782	-.060
Not use6	1.821	.180	-.430	104	.668	-.115	.268	-.561	.330
			-.448	86.634	.655	-.115	.257	-.543	.313

Independent Samples Test- Regarding to Reasons for bring own reusable cup when purchasing beverages in coffee shops within reusable cup possession

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	90% Confidence Interval of the Difference	
								Lower	Upper
USE1	.682	.411	.287	104	.774	.070	.245	-.336	.477
			.296	83.270	.768	.070	.238	-.326	.467
USE2	.289	.592	1.010	104	.315	.165	.163	-.106	.436
			1.020	78.900	.311	.165	.162	-.104	.434
USE3	3.157	.079	.815	104	.417	.193	.236	-.200	.585
			.886	95.941	.378	.193	.217	-.168	.554
USE4	.057	.812	1.905	104	.060	.368	.193	.047	.689
			1.998	87.824	.049	.368	.184	.062	.675
USE5	2.927	.090	.857	104	.393	.212	.247	-.198	.623
			.899	87.835	.371	.212	.236	-.180	.604
USE6	.566	.454	-2.274	104	.025	-.434	.191	-.751	-.117
			-2.232	72.554	.029	-.434	.195	-.758	-.110

Independent Samples Test- Regarding the factors that encouraged to reduce the use of single-use plastic cups

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	90% Confidence Interval of the Difference	
								Lower	Upper
M1	2.602	.110	-.169	104	.866	-.033	.193	-.352	.287
			-.178	89.878	.859	-.033	.182	-.335	.270

Independent Samples Test- Regarding the factors that encouraged to reduce the use of single-use plastic cups (Cont.)

M2	.461	.499	.251	104	.802	.057	.225	-.317	.430
			.243	69.137	.809	.057	.233	-.332	.445
M3	2.687	.104	1.360	104	.177	.299	.220	-.066	.663
			1.417	86.237	.160	.299	.211	-.052	.649
M4	2.552	.113	-0.346	104	.730	-.076	.219	-.440	.288
			-.370	92.390	.712	-.076	.205	-.417	.265
M5	.000	.984	2.533	104	.013	.549	.217	.189	.908
			2.567	79.777	.012	.549	.214	.193	.905
M6	.842	.361	1.120	104	.265	.272	.242	-.131	.674
			1.154	83.528	.252	.272	.235	-.120	.663
M7	1.506	.222	1.868	104	.065	.346	.185	.039	.653
			1.761	64.352	.083	.346	.196	.018	.674
M8	4.504	.036	.429	104	.669	.113	.263	-.324	.550
			.457	91.418	.649	.113	.247	-.298	.524
M9	5.745	.018	1.859	104	.066	.463	.249	.050	.876
			1.991	92.733	.049	.463	.232	.077	.849

BIOGRAPHY

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Publications

Supintuda Suksant & Isaac Jamieson. (2019). *Investigation of the effectiveness of different methods to increase the use of reusable cups for purchased beverages at a university campus in Thailand*. Paper presented at the 16th Pacific Regional Science Conference Organization Summer Institute New Landscape of Data and Sustainable Development, July 25, 2019 Chulalongkorn University, Bangkok, Thailand.